MIDDLE SCHOOL PRINCIPALS' PERCEPTIONS OF TECHNOLOGY INTEGRATION AT SELECT URBAN SCHOOL CAMPUSES

A doctoral Thesis Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
Of the Requirements for the Degree

Doctor of Education

by

Johnny Morse

December 2019

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An Abstract

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Abstract

Background: Technology integration in schools has steadily increased in the United States. Shipments for classroom devices including tablets and laptops have grown from 3 million in 2010 to 14 million in 2017 according to *Education Week* (2017). With the influx of hardware for technology integration, technology spending also rose significantly. *MarketWatch* (2015) predicted a 17% growth with an estimated $252 billion dollars spent annually by 2020. Principals are the primary implementers of technology integration in schools with access to every content area stakeholder on campus. Once a district or campus commits to increasing technology integration, the principals are the primary influence for integration strategies. Teaching on a campus that transitioned to a 1:1 student to computer ratio, I realized the challenges and opportunities of technology integration in the instructional setting. There are numerous sections to technology integration including hardware (computers, laptops, tablets, phones etc.), software (applications, programs, infrastructure (wireless access points, computer labs), and even the instructional strategies themselves (Blended Learning, Personalized Learning). The variations in approaches to technology integration create almost infinite possibilities that can overwhelm not only teachers, but entire campuses. Understanding the abilities of the faculty and needs of the campus directly improves the ability to focus time, effort, and money on the appropriate resources and training. **Purpose:** The purpose of this qualitative project was to determine the perception of principals regarding technology integration in an urban middle school campus. The research question driving this project was: What are principals' perceptions of technology integration in an instructional setting of an urban middle school? This case study analyzed qualitative data

from interviews and mini-focus groups, to collect information on principals' perceptions of technology integration practices. In understanding how principals perceive technology integration, effective methods of creating needs assessments and professional development can be implemented in districts and on campuses. **Methods:** This research was conducted utilizing a collective case study design to provide an in-depth analysis of the participants' perceptions of technology integration, based on their experiences. Purposive sampling was used to identify four principals who were recruited based on holding a current Texas K-12 principal certification and position within an urban middle school in Houston. The principals represent leadership from four schools in three different districts in Houston. The data were collected through individual interviews followed by mini-focus group interviews. Individual interview data were analyzed by inductive coding and the emerging themes were utilized to develop and refine questions for the subsequent mini-focus group interviews. Data analysis for mini-focus group interviews was conducted using the constant comparative method from which themes were derived. **Results:** The results from the study indicated three major themes related to principals' perceptions: (a) principals perceive technology as a benefit to their campus; (b) There was no consensus on effective or ineffective technology integration strategies; (c) principals all had limits in effective and focused staff training and expectations; thus, (d) integration of technology was uneven by teachers across their campuses. There were not set standards for expectations or implementation of technology for staff or students. **Conclusion:** The participants believed technology could be an effective tool for students in the classroom. In the three districts, there were no specific standards on how to implement technology and expectations for technology integration. The training was

available for staff, but only one district had a specific program that all staff were required to take. Districts and campuses should have specific plans and focused training in place for students and staff. For staff, their professional development should be focused on techniques to improve how they implement technology. There were established guidelines from TEA on teacher requirements, and in ISTE for student, staff, and administrator guidelines to build from. Future research should focus on a larger participant pool within a singular district, to understand the overall perception of faculty in the district and build a focused plan addressing district needs.

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Chapter I

Background

Introduction

The integration of technology into school campuses is increasing rapidly across the United States. Specifically, in Texas, more school districts are going 1:1 student to computer ratio to increase student engagement and achievement. One early initiative was the Technology Integration Program in 2006-2007. The Texas legislature provided funding for 22 schools to implement technology for all students (Shapley, 2007). The Houston Independent School District implemented 1:1 programs for all High Schools under the guidance of then Superintendent Dr. Terry Grier (Houston ISD, 2013). The Pasadena ISD has incorporated 1:1 programs since 2014 with various campuses providing computers for every student, even allowing them to bring them home. There are numerous initiatives to put technology in the hands of students, from blended learning classroom, the summit model, and personalized learning plans (PLP), to simply adding technology to campuses and providing a Learning Management System (LMS) as a platform to present information and manage assignments.

With the movement towards technology, funding is also shifting towards technology integration. Schools must account for technology spending on multiple levels ranging from hardware costs (PCs, laptops, tablets), internet connection infrastructure costs for campus connectivity, to internal wireless capabilities for both staff and students. As technology is implemented on campus, there also comes the issue of repairs and lifecycle replacement, adding costs just to maintain the initial capability. With all the

additional spending, leaders must have a clear purpose for technology integration to maximize teacher's ability and student results.

A wide range of technology options exists for all the stakeholders. With all the available options, educational leaders need to determine the best way to not only acquire technology but also make it functional and efficient for their campuses. It takes leaders at the district level to assist in acquiring the technology that will enhance student's educational experiences. District initiatives need to be proactive in their purchasing and implementation, and campus leaders need to understand technology benefits and limitations, and the skillset of their staff to ensure effective and efficient use of technology that occurs on campus. With the shift towards technology, along with initiative in Science, Technology, Engineering, Arts, and Mathematics (STEAM) in education, money is used at the campus and district level to bring technology to the students. If educators cannot properly integrate technology into the classroom, there is a waste of time, resources, and opportunity. Educational leaders need to make technology integration part of their campus planning and training.

There is an unlimited number of combinations for technology integration on campus, and leaders carry a responsibility to be aware of the options and provide the best for both students and staff, while being fiscally responsible to the district and community. Dell, HP, Apple, Acer, and other companies all have products targeting education including tablets, netbooks, laptops, and traditional personal computer (PCs). Every product offers strength and weaknesses in durability to upgradability. Understanding the strength of the staff, and the financial capability of the campus and district are critical in decision-making for technology.

My Story

My initial exposure to education was after graduating college in 2002 and working as a substitute teacher in South Portland Maine for four month, before heading off to Field Artillery School in Lawton Oklahoma to be an Army Officer. I needed temporary work with flexible hours, so I could prepare to leave for my new career. In the few months I taught as a substitute teacher, I found that I really enjoyed working with students and watching them grow. Although it was a short time, I felt I made a small difference with the students. It was also when I was introduced to technology integration in education. The state of Maine was in the second year of an initiative to give all middle school students technology, in this instance MacBooks, to use for school. While working, students would have Wi-Fi access and log in with their MacBooks during class. It was a vastly different from what I had remembered about middle school classes.

My return to the classroom was seven years later in the fall of 2009. I had been an Army Officer and Manager in a Fortune 500 company and I had left my management position after finding my job completely meaningless. This combined with missing the responsibility and training part of the military lead me back to education. Upon submitting my two-week notice, I applied to Teach for America and was heading towards a career that I felt would be as rewarding as being an Army Officer with more freedom to determine my own course. I worked with Teach for America all summer learning how to manage students, write lessons, and deliver quality instruction. I had the opportunity to work with a class in summer school before being hired in Houston Independent School District full time as a 7th grade science teacher.

The transition to the classroom was not easy. I was part of a 3-person, 7th grade science team, and two of us were first-year teachers; the other teacher, though experienced, was teaching 7th grade science for the first time. Walking onto campus, we had no textbook and the previous teachers had taken all their resources with them. There were no products to build from, so we started the year finding and developing all new resources to teach our classes. Our school didn't even have a recent version of textbooks to cover the Texas Essential Knowledge and Skills (TEKS). It was an enormous task creating an entire year's worth of content, which was twice as hard with our combined lack of experience. It was also extremely beneficial for two reasons. As a team, we had to break down every TEK to build labs and content. There wasn't anyone to hand us lessons. It also led to us creating a shared digital library with all the resources we found and created, so we wouldn't be in the position again. As we worked together for three years, we added to the resources that were refined and developed. After three years, I left for a campus closer to where I lived, walking away with a full 7th and 8th grade science curriculum that I had created and tested. It included presentations, formative assessments, summative assessments tests, projects games, tutorials, and many other products for the classroom.

During my 4th year of teaching, I was working on a campus that went from traditional in 2012-2013 to 1:1 in 2013-2014. All teachers received tablets; our students received HP netbooks to at home and in class every day. Every teacher on staff received a netbook the year prior to getting comfortable with using them in class. I received minimal training, none of which involved software or how to integrate technology on campus. I was introduced to three Learning Management Systems Schoology, Project

Share, and Edmodo. The campus was given free choice of what system they would use and how to use their netbooks in class. This created more problems than it solved. Many teachers were still operating analog, digging in crates, and pulling worksheets or making photocopies, so even though they had the technology, they didn't have any lessons to give their students electronically. There were minimal online resources, or even textbooks to direct our students to the first year. Teachers used the resources they found and created, or they didn't use the netbooks at all. We also found that our students had limited knowledge and ability to use technology appropriately for instructional purposes. Students were unfamiliar with how to download and save documents, properly navigate the internet for research, and other basic computer skills. It was exactly as Suhr (2010) found in his research, that there was minimal growth the first year of the 1:1 program because both students and teachers were getting used to the new learning environment.

Along with the lack of resources, there was little guidance from administration, both at the district and campus levels. Besides the resources, there was only general guidance on what the expectations were for implementation. I attempted to find and manage resources. I had already created a digital library, so I was fortunate enough to have some digital content to provide my department and our students. Otherwise, I would have had nothing to engage my students with digitally. I chose to do research on my own time into finding digital content and creating additional digital content for my students. I learned how to use free software and the few digital items the district had made available to us. Through the first year, I spent dozens of hours in personal professional development. It was not until the 3rd year, that we were provided a digital textbook, mostly aligned to Texas Education Association Standards. It was once again

up to the teachers to vet material and make it usable for our students. I was selected as a trainer, by the district, to assist other teachers in the district with reviewing and customizing content. On campus, I assisted in creating Schoology classes and moving towards a method of blended instruction. I found ways to ensure my students were maximizing the use of the technology provided to them.

After my 6th year in the classroom, I became an assistant principal. The new school I was working at was no longer 1:1 but was gaining technology and looking for ways to effectively use it. Even though I had a strong background in how to use technology in the classroom, I had to learn how to get my teams to effectively use technology in theirs. In my first year, technology integration was far from my focus. I spent more time learning about my new school and the team than focusing on technology applications in the classroom. Going forward as an educational leader I needed to enhance my team's abilities to use and integrate technology into their instructional and professional environment. In learning how to enhance the abilities of my team, I directly impact student achievement. I can also understand how to scale out technology integration and application for both students and staff.

Purpose

The purpose of the qualitative project is to determine the perceptions of principals in understanding technology integration in an urban middle school campus. Working in an educational leadership role as an assistant principal, widened my vision and application instruction. The study will determine how principals feel technology is effectively integrated into an instructional setting. A major step in integration is developing a needs assessment and a plan forward. Assessing the staff's perception helps

guide what they think technology integration is and how to move toward effective technology integration.

Texas is not the only place where technology integration is growing. Some states have had 1:1 programs for over a decade. Maine Governor Angus King decided in 2001 to put a budget surplus towards giving every middle school student a laptop for the classroom (Curtis, 2013). This program is now known as the Maine Learning Technology Initiative (MLTI). As a teacher, I was forced to do my own research and find effective applications for technology in the instructional setting. Through my research, I hope to minimize this struggle for teachers on my campus and throughout my district. I spent hundreds of hours digitizing resources, vetting software, and researching websites and textbooks. As a principal, I want to find ways to meet teacher's needs so they will not only understand how to integrate technology into instruction but also want to use it for instruction. I feel this will come from understanding what their specific needs are for instructional applications and the best way to assist educators in adopting the available technology.

Research Question

The present study evaluates urban middle school principals' perceptions and gathers data on their technology implementation and practices. In understanding their perceptions in identifying both effective and ineffective practices, plans can be developed for training, targeting, and implementing the best or most effective practices for technology integration for individual teachers. The data can also be used to assist principals in identifying ineffective practices and techniques and maximize the

effectiveness of technology on campus. The research question for this study is as follows:

1. What are principals' perceptions regarding technology integration in the urban middle school classroom?

The increased use of technology in and out of school is an important and growing factor in curriculum and financial decisions. From the acquisition to implementation of technology, it is analyzed at the federal (NCES, 2003) to the district level (HISD, 2013). While the planning process is dedicated to obtaining the most effective equipment to the students, do we require teachers to have the most effective training and practices for using technology in the classroom? The results of numerous research studies suggest there are benefits, but also show problems with technology integration. Test scores are inconclusive in determining how effective technology use in the instructional setting is yet spending continues to increase annually.

There is an infinite number of ways to analyze how and why technology is effective or ineffective. Researchers have analyzed student engagement levels (Schindler, Burkholder, Morad, & Marsh, 2017), student test scores (Shapley, 2007). While research is continuing to grow, the present study is a small sample of the possible and necessary variables educational leadership needs to understand in technology integration into the urban middle school classroom. The present study investigates the principal’s perception regarding effective technology implementation in the instructional setting.

Significance

The shift going on in education is due to the consistent growth of technology. Students and teachers have the full spectrum of materials within reach. The traditional paper and pen classrooms are dissolving. The campus the researcher currently works for has 1,060 students and over 500 Chromebooks available for use on the campus. The campus is fully wired for Wi-Fi connectivity in every classroom, along with Promethean touch screens that also have Wi-Fi connectivity. There is a movement in the district to go 2:1. The technology department has committed to initiatives to provide teachers additional access to computers through goals for professional development and shifting financial resources to technology. As additional technology becomes available, we need to ensure all teachers understand and are capable of fully integrating technology into the classroom. The technology is purchased and is on the campus, but the use is sporadic and inconsistent across all content areas.

Analyzing the 2003 MLTI survey, there were significant issues with the lack of training for teachers prior to the institution of the program. In the initial survey, teachers responded about how they learned "a great deal about technology from a colleague (93%) and on their own (94%)" (Harris & Silvernail, p. 17, 2003). After reviewing numerous 1:1 programs across schools and districts, November (2013) writes, "Adding a digital device to the classroom without a fundamental change in the culture of teaching and learning will not lead to significant improvement." One of the key fixes November (2013) determined is "support the design of an ongoing and embedded staff development program that focuses on pedagogy as much as technology."

In a study conducted on 1:1 immersion programs in Texas following the 2003 Technology Immersion Program created by the Texas Legislature, there was a wide range of results based on implementation. Some schools found success and other had minimal to no statistically significant growth in student achievement. One of the major factors in the success or failure of the program was the initial implementation. Shapley (2010) found that 81% of classrooms reached partial implementation or minimal implementation after four years in the program. The schools with the highest immersion level had three common identifiers, "strength of administrative leadership, teachers' collective support for innovative practices, and the quality of professional development" (Shapley, 2010, p. 44). The research project is designed to create a framework for creating a needs assessment and a professional development plan for a staff.

In discussing the application of social education, technology can be the great equalizer. When analyzing the gaps and challenges in education, resources are major obstacles. The American Heritage Society is one organization that has focused on providing high quality resources for history education, specifically technology in teaming with the council of great city schools. There are unlimited applications for technology, for learners at all levels. Every concept taught can be delivered through one device. Assessments can be made, goals can be charted, reviews administered, and almost every aspect of teaching can be addressed through the proper use of technology. It allows students control more of their learning with access to video, reading, and information on any topic. There are also tutorials built with programs like Khan Academy leading the way.

I see effective integration of technology in the urban middle school classroom as the great equalizer. Not only with the wealth of information, but also the sheer range of students that can be assisted. Technology applications address English Language Learners (ELL), Special Education, 504, and any other student demographic. Proper use and integration can cover a wide range of gaps in instruction, but the real challenge is finding ways to make educators comfortable using technology applications and maximizing the impact of the available tools.

In domestic and international education, technology provides the same information to all students. Even when economic disparities exist in the level of the school, teacher's community students can still have access to the basic elements of academic growth. For example, Khan Academy is presented in four languages, and PhET Interactive Simulations has lessons in almost 100 languages (PhET). This provides the same access to students worldwide. Additional software is providing students with access to information and resources they otherwise wouldn't have. In a single classroom, students can work on any subject, at any grade level. While technology alone cannot make up for every disparity, it can help bridge many of the gaps, and improve education at the local to global levels.

Chapter II

Literature Review

Introduction

Technology integration into education has taken many forms. With the invention of television, many saw it as the leap forward that would remove the teacher from the front of the classroom. While the advances in technology offered much promise, there was never a significant shift in the dynamics of the classroom. Even as technology moved forward from television to computers, and computers to wireless networks, fundamentally the classroom has not had a shift. The teacher is still the central figure surrounded by recipients, the students.

The lack of progress has not been due to a lack of technology in the classroom. One reason could be *No Child Left Behind* (U.S. Congress, 2001), as schools try to ensure they are meeting requirements, specifically in accordance with "research-based programs." With the standard being set, they must be 1) grounded in theory, 2) evaluated by third parties, 3) published in peer-reviewed journals, 4) sustainable, 5) replicable in schools with diverse settings, and 6) able to demonstrate evidence of effectiveness (U.S. Congress, 2001). While money is spent in districts across the country to acquire technology for the instructional setting, meeting these criteria is one reason technology hasn't been utilized as effectively. The bigger issue is the administrators' lack of understanding of how to use and integrate technology in the classroom.

There has been guidance from the government in No Child Left Behind (NCLB), Every Student Succeeds Act (ESSA), and locally from the Texas Education Agency

(TEA); however, regulation lacks. The rapidly advancing role of technology in education is outpacing the ability to create standards. In conjunction with the rapid rate of change, the lack of a constant and reliable measurement of effectiveness prevents specific guidance from regulations. The lack of specific measurements drives this from being a quantitative to a qualitative study, and the use of perception as a measurement for this study.

To fully understand the wide range of technology applications and possibilities, this section details the major hardware, software, and strategies for technology integration in the instructional setting. The technology itself sets up the framework research the funding, effectiveness and professional development scope. All acquired data will be compared to existing standards, and guidance from ISTE and the federal government. Within these applications, the focus will be on the ability of principals to understand the impact in urban middle school students through the integration of technology in the instructional setting. The analysis and research for technology integration in the instructional setting has shown great promise, albeit wasteful spending. The review of the literature helps shape the focal points of the study and creates the baseline for the data analysis.

Theoretical Framework

The theoretical framework for this study is based on a constructivist ideology. It is through actions and experience that we construct our reality and perception. Dewey, Paiget, Vygotsky, and even Socrates are considered founders of constructivist theory in education. Their beliefs and philosophies are centered on building, learning, and doing. The integration of technology in the classroom coincides with this theory. Technology

allows students to apply concepts they have learned by doing in the classroom. Students can retrieve information, verify data, and work independently with minimal guidance from the teacher. Researching, verifying, and manipulating information and concepts is the base for critical thinking and analysis.

An early theory by Paiget is critical in understanding the role technology can and should play in education. Paiget believed that "knowledge is actively constructed by the learner and not passively transmitted by the educator" (Boudourides, 2003). Successful integration of technology allows the students to construct their knowledge and the teacher to be the passive influence for assistance and direction. Theories pioneered by Vygotsky also apply under this philosophy.

Vygotsky (1978), primarily a philosopher, contributed to constructivist theory in education including the Zone of Proximal Development (ZPD) and the concept of a More Knowledgeable Other. These concepts push students' abilities and are widely known and used in education. The proper application of technology can assist in assessing students and ensuring that they are working within their ZPD. Technology used for personalized learning is built on this foundational concept. The software assesses and serves as the 'More Knowledgeable Other' to assist and keep the student working in their ZPD. If the software is unable to serve as the 'More Knowledgeable Other,' collaborations with colleagues and experts online can fill that role. Vygotsky's (1978) research focused on communication and collaboration being an integral part of the learning process. Specifically, Vygotsky (1978) stated that "cognitive growth occurs first on a social level, and then it can occur within the individual." This is also known as social constructivism and relates back to the Socratic method. The questioning and discussion process in the

Socratic method can be understood as both the More Knowledgeable Other and as the collaboration between colleagues. Technology now provides the ability to create a More Knowledge Other, collaborate with peers and colleagues, and have education profession discourse to further education, when integrated effectively in the classroom.

To properly integrate technology into the classroom, teachers need to be trained in hands-on application of instructional technology. In a study by Abbas (2013), there was a positive correlation between the uses of computers by teachers based on being shown how to implement them in the classroom. Specifically, by modeling, teachers were more likely adopt these practices (Abbas, 2013). The constructivist use of computers in the classroom has been proven to lead to positive outcomes of increased collaboration and cooperation for students (Dawson, Cavanaugh, & Ritzbaugh, 2006). It also revealed that with more teacher training and implementation, there was a meaningful use of computers. There was an increase in the use of computers for critical thinking skills, processing information, and manipulating educational software (Dawson, Cavanaugh, & Ritzbaugh, 2006).

Technology Integration

The key to moving forward is technology integration into the instructional setting. Technology integration is a very broad spectrum**.** There are major areas for technology integration in the classroom including hardware (tablets, computers, smartphones), and educational programs (Khan Academy, PhET Interactive, Jason.org), to management programs, and social media. Reiser (2001) refers to this as Instructional Design and Technology (IDT) and defines it as:

> The field of instructional design and technology encompasses the analysis of learning and performance problems, and the design, development, implementation, and evaluation and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings, particularly educational institutions and the workplace. Professionals in the field of instructional design and technology often use systemic instructional design procedures and employ a variety of instructional media to accomplish their goals. Moreover, in recent years they have paid increasing attention to non-instructional solutions to some performance problems. Research and theory related to each of the aforementioned areas is also an important part of the field. (p 10.)

The National Center for Education Statistics (NCES) has a different analysis. In 2002, a task force in the U.S. Department of education developed a guide for technology in elementary and secondary education. It was simply labeled "Technology in Schools." Within the handbook, they provide a definition for technology integration stating, "Technology integration is the incorporation of technology and resources and technology-based practices into the daily routines, work, and management of schools." The NCES further breaks down what are considered as technological resources. The guide itself is designed to create a list of indicators and data points for users to create standards for their technology integration plans. With this guide, administrators at all levels would have a framework to design district down to campus data integration plans and develop the metrics to measure their effectiveness and progress. The NCES report

also addresses policy, equipment and infrastructure, teacher preparation and professional development.

The research into Technology Integration Programs (TIP) yields various designs and models. Guymon (2014) offers one simple method, "The 5 Steps of Effective Technology Integration." He addresses concerns and integration at the classroom level. The design begins with identifying and addressing the benefits, determining objectives and assessments, designing instructional strategies, preparing the instructional environment, and analyzing and making revisions (Guymon, 2014). It's a cyclical model to produce constant improvements; however, it is ineffective for use across an entire campus because it is too personalized. Once the technology was properly integrated, it served as a guide for reflection and professional growth.

Research in Singapore resulted in the development of a much more comprehensive model, which identifies the three major levels of integration. The Information and Communication Technology (ICT) model developed by Wang and Woo (2007) breaks out micro (Lesson), meso (Topic), and macro (Curriculum) level for integration and focuses on the application at different levels instead of across a campus. Their research also has a rationale for technology integration, stating, "Technology should not be used not because it is available, or it has been shown effective in some cases. It should be used to enable the process and enhance learning" (Wang & Woo, 2007, p. 155). They refer to teachers as teacher designers who are the ultimate authority in managing technology integration. The model is also cyclical, and improvements can be implemented at any level throughout the model. The developed process doesn't focus on any one type of technology; rather, it is utilized as a tool for developing the

curriculum. The design is merely an additional tool for instruction, to be adopted by the teacher. The teacher designer makes decisions on technology based on the educational goals.

Given the literature and the aims of this research, for the purposes of this study, Technology Integration is defined as technology applications for instruction. While simple, it allows for the broad range of possibilities identified in the technology integration literature, and would include using cell phones for research, flipped classrooms reading on computers, to communicating assignments through Schoology. With a massive evolving scope for classrooms, an open definition is the safest and best way to define the process. Within the process, there are several major areas to address when looking at integration, educational technology (hardware) itself, learning management systems (software), and applications (Software).

Educational Technology

One of the first and most vital parts of technology integration is determining the type and amount of technology being integrated into an instructional setting. Understanding what technology integration in the instructional setting is allows for a better understanding and guidelines for technology integration. When discussing educational technology, it will refer to technology students use to interact in the instructional setting. The decision on the specific educational technology will set the boundaries for applications and student interactions. It is an evolving concept that 20 years ago, fully updating the educational technology on a campus would be every teacher having a computer and projector. Now having a smartboard for every class puts you at the front of educational technology. Campuses struggle with evaluating wireless network

capabilities (Wi-Fi) against how many devices will be on it. Districts are moving to 1:1, where every student has educational technology from the school to use and take home. While there is no best educational technology, there are numerous options and implementation strategies. With all the options, analyzing everything would be nearly impossible. This study will focus on the major types of technology found in educational settings.

The introduction of the computer to the instructional setting created unlimited possibilities for student engagement by bringing internet connectivity, word processing, and video and audio to the classroom. The possibility of what computers can accomplish in education has been a dream, much debated since the sixties. In early theories, it was suggested that teachers could be completely replaced by technology. Phillip Jackson referred to the teaching machine (Hlebowitsh, 1988) as "an invention that promised to reduce error, increase efficiency, speed, learning, cut manpower costs, and ultimately transform teaching from something that resembled black magic into an applied science" (Jackson, 1968, p. 15). In a 1966 issue of *Scientific American*, Patrick Suppes (1966) predicted that the use of a computer would give students access (Hlebowitsh) "to the personal services of a tutor as well-informed and responsive as Aristotle" (p. 201). The central idea and of optimism these researchers were two-fold. The computer could "individually differentiate instruction for learners" and "fit the pace of instruction with the pace of the learner" (Hlebowitsh, 1988, p. 53). These are still two of the main points pushing technology integration in the classroom today. While districts and campuses share the vision, and understanding of the possibilities, 50 years later, education is still trying reach the expectations of Suppes and Jackson. Limitations in ability and funding

have proven those early ideas false. Computers may not have met early goals and theories; they have however brought change to education and instruction.

Inside the classroom, educational technology takes many forms and has a wide range of applications. At its most basic level, it can be considered a projector and board: a simple technology for presenting information to students with little ability for interaction. The growth in this type of educational technology is the move to interactive whiteboards. It takes the static presentation design and allows teachers and students to interact with the images or presentation. The first interactive whiteboards were created by Xerox Parc in 1990 and were intended for use in business and small meetings. Designed to enhance presentations and make them more interactive, they have grown as an industry. Commonly referred to as Smart or Promethean boards (Manufacturer Brands), they have slowly become commonplace in education within the U.K., with 70% of middle and elementary classrooms having a form of interactive board. According to Philips (2008) in Newsweek, this is the case for 16% of U.S. schools. The interactive whiteboard allows for enhanced levels of interaction with the students. Along with visual and auditory applications, kinesthetic applications can improve classroom engagement for all types of learners.

The laptop version of the computer has enhanced the possibilities for computers in the classroom and instruction. Being smaller and more portable, laptops are a viable option for all students. It has given rise to 1:1 programs in schools across the country. With the major benefits being internet connectivity, word processing, research, and audio and video capabilities in a portable platform. The laptop has given students access to

multiple types of instructional resources inside and outside of the classroom. It has also given teachers numerous options to deliver content and assess students.

Integration of laptops into schools happens in a variety of ways. In Newswire, Rockman identified five models of laptop use in education: Concentrated, in which each student has their own, Class set at school, where classroom sets are shared amongst teachers, Dispersed, where there is a mix of students with and without laptops, The desktop-each classroom, where there are permanently assigned laptops to share, and Mixed, which is any of the above combinations (Rockman, 1998). Each model determines what level of technology integration the teacher can achieve and the flexibility in those goals. With this flexibility, blended learning, personalized learning, and other strategies have been evolving in the classroom. Laptops, in delivering content, allow for numerous upgrades over traditional instruction. Teachers could supplement lessons with interactive assessments and multiple inputs. Students can read articles, listen to books, or watch videos to gain content knowledge. The laptop fundamentally changes how an entire classroom functions. Students can get the same content through multiple means, all at the same time. Teachers can give instant feedback and assessments, and work at multiple differentiated levels.

Tablets have had an increasing role in education. The ability to use multiple applications to deliver content makes tablets a resource across campuses. A single tablet allows students to work on content in all subjects, with the proper applications (Apps) installed. The tablet is only as useful as the applications it can use. Lacking a keyboard and needing Apps, there are benefits in having a lower initial cost for hardware; however, there is an increase in cost as more Apps are used. Based on a study by Montrieux,

Vanderlinde, Schellens, and De Marez (2015) into the perceptions of teachers and students, most teachers fell into two categories when using tablets. One category was described as the “instrumental teachers,” and they simply used tablets to replace textbooks and other simple functions within the classroom; 67% of teachers fall into this category, with many citing the lack of training and fear that students would be off-task as reasons for limiting their applications (Montriuex et al., 2015). The second group, 33% of the teacher participants, was the “innovative teachers” that found ways to involve the students with multimedia and interactive processes referred to as the “digital didactive” approach (Montriuex et al., 2015). Furthermore, students perceived their teachers as needing additional training in the use of devices (Montriuex et al., 2015).

All the devices provide different methods for delivering content to students. The biggest influence is how the teachers use technology in their classrooms. It is the teacher’s ability to engage the students through effective practices, and knowing how to maximize technology in their classrooms, that will make the difference. The administration needs to be proactive and supportive in providing the staff with the resources to understand how to integrate technology in the instructional setting. There are different approaches to applying the wide range of technology available.

Blended learning, a term that has been around for over 20 years, has emerged as a widely implemented instructional strategy. The increased access to technology has made it a more viable option for instruction. Yong (2016) defines it as "the purposeful integration of asynchronous and online learning experience with face-to-face learning." It has gained popularity in its ability to cater to a multitude of learners. Hassel uses a simple definition; “blended learning is any time a student learns in part at a supervised

brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace." The allure and potential of blended learning lies in its integrated concept, combining multi-media and online components with traditional face-to-face instruction. In collegiate courses, this style of interaction is frequently referred to as hybrid course, a combination of online assignments with limited instructor or face-to-face interaction. K-12 has a more structured interpretation of blended learning environments. Blended learning has given rise to charter schools, solely based on this strategy alone as a method of instruction. The charter schools Carpe Diem, Basis, and Summit all used a blended and personalized learning base as their primary method for content delivery to students.

Personalized learning is a similar strategy to blended learning. Personalized Learning as defined by the International Association for K-12 Online Learning (iNACOL) is "tailoring learning for each student's strengths, needs, and interests-including enabling student's voice and choice in what, how, when, and where they learn to provide flexibility and support to ensure mastery of the highest standards possible" (iNACOL, 2016). In a personalized learning model, educators act as guides or mentors to the learning process. The technology helps deliver content and monitor progression as the student works on their plan. The process allows the students to determine what they work on at their own pace. Educators meet with students to ensure that they are making adequate progress then determine any interventions and additional instruction as needed. Personalized learning is a new trend, with the U.S. Department of Education spending half a billion dollars to "embrace the trend," and conduct research into the programs (Herold, 2016). Mark Zuckerberg, Chief Executive Officer of Facebook, has partnered

with Summit schools to create a free personalized learning plan called the "Summit Personalized Learning Platform" (Singer, 2016). In 2016, the Facebook backed platform had been introduced to nearly 120 schools. From the Summit basecamp, it was reported that they partner with 19 public schools, 15 school districts, and four charter school in 2015 (Summit Basecamp, 2015) The Summit Program offers Summit Basecamp to more than 1,500 educators in public and private institutions over the summer with Summit programs running in public schools in Oklahoma, Rhode Island, and Texas (Singer, 2016).

Mobile learning also referred to as M-Learning is also increasing in schools. Woodard (2011) defines M-Learning as "learning with the aid of handheld technology." In this style of learning, students may use a phone, laptop, tablet, or any other portable device to access content. One major advantage of M-Learning is that students can use their own device, and it reduces the infrastructure required to access online resources. M-Learning allows for the students to not only access content in school, but also out of school, and reduces the need for extra hardware at home. M-Learning encourages more interaction between students, and between students and teachers through social media, and in conjunction with E-Learning, inside and outside of the campus. There are however drawbacks to M-Learning. There is no standardization because of all the possible devices used to implement it. Monitoring, regulating, and clearly defining usage within the classroom is almost impossible. Not all online educational material is compatible with all the possible devices students may use. Educational applications may be limited to Google, Apple, or Microsoft only, and not compatible across operating systems. In a mixed device classroom, this would limit student's access to content.

M-Learning has grown substantially. The United Nations Educational, Scientific, and cultural organizations dedicated a week to its potential globally (UNESCO, 2018). They contained workshops to assist with skills and policy building. To effectively integrate M-Learning into the regular flow of the classroom, teachers must understand both the capabilities of their online applications and software, and the capabilities of their students' devices. M-Learning adds a great range of potential growth and outlets to connect with students, but also additional layers of planning that teachers and administrators need to understand. The increased level of access is a great strength, but also requires strong planning, clear guidance, and management strategies.

Professional Development

Peterson (2016) examined districts and their professional development training for technology in the article "Technology Starts with Professional Development and Training." Peterson (2016) offers strategies from different school districts to build the capacity to integrate technology in the classroom. One of the key strategies identified was based on asking teachers what they needed to focus on and asking the technology specialists what the teachers on campus needed. The conclusion was that a needs assessment needed to be conducted for the staff to create a plan for professional development. The article also focused on making it fun and easy for teachers to train including offering incentives. The Rowan Salisbury School District scheduled twitter chats for all teachers (Peterson, 2016). Peterson (2016) also recommended trying to plan technology training during the school day, and not make it the teacher's responsibility to learn on his or her own time. According to Peterson (2016), "57% of K-12 principals said it was the lack of teacher training on how to integrate digital instruction into

technology that was the major barrier to more technology and digital content to classrooms."

Howard, Chan, and Caputi (2014) addressed professional development and integration at the subject level. Their research emphasized the differences stating, "adaptation and effective integration is not clearly understood, particularly differences between subject areas" (Howard, Chan, & Caputi, 2014). Their research delves into each subject having different needs and outcomes from technology integration in secondary educational settings. Different technology tools were matched with different subject area skills. The study involved a large sample size of 25,000 secondary level teaching staff between 2010 and 2012. Looking at teacher beliefs and conducting a qualitative and quantitative analysis, they studied teacher's belief in technology supporting learning and technology usage over time (Howard, Chan, & Caputi, 2014). Their study found that subject area does matter in technology integration. There were consistent differences in belief in integration and readiness.

In developing ways to integrate technology, an important aspect is to understand individual teacher's strengths and weaknesses. In a study by Adoniou (2015), how to find gaps in teachers' professional ability was analyzed. Adoniou (2015) separated teacher knowledge into six domains to develop a holistic picture on the range of necessary knowledge. The six domains are:

Knowledge about content (Shulman, 1986) – specifically, understanding how the English language works in literacy and literature.

Knowledge about theory (Shulman, 1986) – theoretical understandings about teaching literacy, and their history.

Knowledge about teaching (Lenski & Nierstheimer, 2006) – pedagogical understandings of how to teach literacy. This could also be described through Shulman's notion of pedagogical content knowledge, the capacity of teachers to apply their general pedagogic skills to teach discipline content (Shulman, 1986), including the curriculum documents they must work with, in order to plan and assess.

Knowledge about their learners (Lenski & Nierstheimer, 2006) – the literacy learning needs of the diversity of children in the teachers' classrooms.

Knowledge about school context – the school and community they teach in and how that may impact upon the literacy teaching strategies they require, and the ways in which they are required to plan, report, assess, and administer their literacy teaching.

Knowledge about the sociocultural politics of teaching – the ways in which larger political agendas impact upon the teaching of literacy, for example, national testing, school league tables.

The domains incorporate parts of Shulman's research (Shulman, 1986) along with research from Lenski & Nierstheimer's (Lenski & Nierstheimer, 2006). These domains overlap in concepts and understanding. Understanding how they impact teaching and learning can enhance strategies to implement instructional technology in the classroom. Adoniou creates a framework to identify gaps in the teacher preparation and whole

teacher knowledge. Transferring the application to technical understanding could help create professional development strategies catered to each teacher's needs.

Technology Funding in Education Technology

The use of technology by students is steadily growing. Some states have had 1:1 programs for over a decade. Maine Governor Angus King decided, in 2001, to put a budget surplus towards giving every middle school student a laptop for the classroom (Curtis, 2013). This program is now known as the Maine Learning Technology Initiative (MLTI). The Pasadena independent school district has been transitioning to a 1:1 district for five years; in 2014-2015, technology services accounted for $4,999,693, and in 2015-2016, $3,747,663 (PISD Budget 2016, p. 64). In 2011, 300 students were given tablets for a pilot program, and that has grown to over 20,000 students in grades 5-10 (Ullman, 2015). Klein ISD has four high schools and they are all currently 1:1. Houston Independent School district has also gone 1:1 on all their high school campuses. One-to-one programs are expanding throughout the state and across the country. Planning and preparing to implement technology are a growing need in education, locally and nationally.

With the rapid rise of technology in education, technology spending in the U.S. has also greatly risen. It is estimated that venture spending in education was over $1 billion dollars in 2014 (Koba, 2015). The reason so many entities are willing to invest in technology spending in education is because in 2010-2012, there was $632 billion spent in the U.S. alone (Koba, 2015). Pearson Education has even created a fund to enhance learning globally. The Pearson Affordable Learning Fund (PALF) was created to invest

in global education projects. Many of which are dedicated to closing the education gap through technology. Pearson dedicated $50 million dollars to begin the fund (EdSurge).

The rise in spending is not isolated to programs in the U.S. and 1:1 computing; some of it is dedicated to infrastructure upgrades for technology, and updating school logistics (intercoms, video screens, fiber optic cable, servers). The largest spending according to Research and Market (2015) has been by the telecommunications segment for Information and Communication Technology (ICT). In 2008, $16 billion dollars was spent on telecommunications, a figure that has been steadily growing, and it is estimated to hit $56 billion in 2012 (Nagel, 08). It is estimated that 99% of U.S. schools have internet connectivity, although it is still an issue of an economics gap (Scott, 2015). Newer schools and schools in more affluent areas can afford wireless connectivity throughout their campus and high-speed internet, while schools with less money are limited to computer labs and time-rationed usage. It is not just spending in the United States as Britain's spending on technology in education is also on the rise. For the 2014-2015 school year, an increase in spending of 596 million pounds is projected (Collins, 2013). MarketWatch (2015) predicts a 17% growth with an estimated $252 billion dollars spent annually by 2020. Globally, hardware spending alone was $15 billion dollars in 2015 (Molner, 2016). The U.S. accounted for $6.6 Billion of the global IT spending in 2015 (Mccandles, 2015).

Effectiveness of Technology Integration

There have been quantitative studies on the overall effectiveness of students using laptops vs. students without laptops. Kposowa and Valdez (2013) specifically studied student laptop use and standardized test scores, conducting research in a Cielo Vista

Elementary school consisting of almost 600 4th and 5th grade students, with 44% identified as ELL. There were multiple variables analyzed in their research, from parent's education level to hours using the computer for games. While the study did find that 37.73% of the students used the laptop to browse the internet vs. 24.45% who used it to write papers, the results did show a significant increase in scores on their standardized tests vs. the control group (Kposowa & Valdez, 2013).

Suhr (2010) conducted a study showing growth; the research involved 1:1 classrooms and reducing the decline many students have in accountability testing, from 4th grade to 5th grade. The research revealed a growth of over 2% compared to non-1:1 students who declined 16% over the same period (Suhr, 2010, p. 64). Both Suhr (2010) and Kposowa and Valdez (2013) had other variables indicating that most students used the computers for playing games and using the internet for non-academic reasons; nevertheless, both studies revealed academic growth over control groups.

Not all studies have shown positive academic results for the technology integration programs or the 1:1 programs. The Organization for Economic Co-operation and Development analyzed results from the PISA test, which showed no noticeable improvements in reading, mathematics, or science by countries that have invested heavily in technology (Coughlan, 2015). Coughlan (2015) projected worldwide annual spending on technology to be 17.5 billion British Pounds, which equals $21.5 billion U.S. Dollars. The highest achieving countries on the PISA had lower levels of computer use in school. While the article clearly states that there is no improvement, there is qualitative evidence to clarify the statements. The New York Times also reported that many states and districts were dropping 1:1 programs due to costs and ineffectiveness (Hu, 2007). The

New York Times provided districts' reasons such as teacher frustration and financial costs of repair, for giving up on laptops. They further cite a $275 million-dollar project being put on hold in Florida due to potential maintenance costs. They piloted a program for $7.2 million that ended up costing an extra $100,000 a year. It was for 6,000 students, and they were looking at implementing it district-wide to accommodate 260,000 students.

Two separate articles really clarify the conflicting evidence and information presented throughout the literature. There is enough evidence to validate beginning or denying 1:1 programs. Articles by Goodwin and O'Donovan analyze both the benefits and obstacles related to 1:1 programs. O'Donovan (2009) states, "in my experience laptops do not have a direct bearing on standardized test scores." He identifies the need for leadership in implementing and continuing laptop programs to determine their effectiveness and overall success. He further identifies the need for stakeholders to be invested in the new culture. This is created through professional development, and "building a baseline of proficiency" and "helping teachers use laptops as instructional tools" (O'Donovan, 2009). These ideas coincide with Goodwin's evaluation of how to implement them, stating, "one-to-one laptop programs are only as effective or ineffective as the schools that adopt them." In Texas, Michigan, and Maine there were mixed results across campuses. In Maine, there was no significant result except for an increase in writing. In Michigan, there was a higher achievement in four schools, lower achievement in three schools, and no difference in one. In Texas, there was a slight growth in mathematics, while writing was lower (Goodwin, 2009).

State to state and school to school, some student performed better, while students did not. Based on the literature, one can conclude that the different approaches to technology integration enhanced or hindered the programs. Goodwin, O'Donovan, Shapley, and Kposowa all include teacher training, buy-in, and professional developments as factors that determine outcomes in not only 1:1 programs, but the effectiveness of all programs on campus. Before making moves to 1:1 programs, a proper needs assessment must be conducted at the district level and lower (Goodwin, 2011). The findings show that the problem is not in the tool of technology, but in its improper implementation. Proper coordination, training, and facilitation are what it takes to make a program successful. The research shows the potential for success, and policymakers need to understand that using technology is more than purchasing technology and giving it to the students; there is training, and infrastructure issues that must be addressed to protect and maximize the investment.

Multicultural Impact

The article by Damarin (1998) investigates the similarities and differences in the growth of technology in education to multicultural education. In reviewing the growth of both movements, Damarin (1998) provides an in-depth review of Friere's work, and how multicultural education has expanded based on many of his ideas. Damarin (1998) finds major differences in the initial analysis focusing on funding, and explains that it is great for technology, although a push by large corporations is almost non-existent for multicultural education. Furthermore, Damarin (1998) also finds that they remain independent while being researched and implemented simultaneously. The article concludes with the convergence of the ideas on two principles; "the preclusion of student

accumulation of preselected facts as the driving mode of education and the assertion that the social organization of the classroom must change in ways that not only displays the authority of the teacher as the dispenser of knowledge but also disrupt the traditional hierarchies (pre) determining who succeeds in school" (Damarin, 1998, p. 17). Damarin (1998) finds three major parallels of multicultural education and technology in education that will assist in their cooperative growth.

McShay (2005) looks at similarities in teacher prep programs; he even cites Damarin's work as linking technology to teacher preparation programs. He also shares the view of the necessity of new teacher's understandings, diversity, and expanding student cultures in the U.S. The University of Iowa created an online project to help pre-service teachers see and understand other cultures and grow their cultural awareness. The research and online program referred to double infusion using technology to enhance multicultural education. McShay's ideas parallel Damarin's when he states, "instructional technology and critical multicultural teacher education agendas (uncommon with other program areas) are rarely pursued collectively to achieve educational goals" (McShay, 2005, p. 54).

Çiftçi (2015) designed a qualitative study evaluating the availability of research on multicultural interactions. The purpose of the study was to determine how technology is used for intercultural learning. In the qualitative study, 26 articles were reviewed for the key in terminology. The results indicated that the U.S. was the leading country for technology-based intercultural exchanges, and most students were satisfied with the projects and even found joy in using technology for intercultural exchanges (Çiftçi, 2015). Nevertheless, limitations in the technology itself, which could hinder the

exchange were determined, and a need for additional training and development in the process was determined (Çiftçi, 2015).

Ferdig (2007) references a wide range of uses of technology and the impact on multicultural education when analyzing five case studies covering pre-service teachers and literacy, social media networks, medical students, focused international studies, and online gaming. One commonality in the case studies was that the biggest benefit was different backgrounds coming together to further ideas. One of the most in-depth studies using technology in education involved medical students, whose interactions were assessed while using technology to work with virtual patients from different backgrounds. In all areas, Ferdig (2007) determined that leaders of design and globalization were pushing technology integration.

The International Association for K-12 Online Learning (iNACOL) has researched and created a template for competency-based learning leveraging equity as one of the primary tenets. The study for iNACOL by Sturgis and Casey (2018) is titled Designing for Equity: Leveraging Competency Based Education to Ensure all Students Succeed. In their effort, they place relational belonging and inclusion, cultural responsiveness, and growth mindset as part of the key characteristics of inclusivity and empowerment. The concept is in line with creating a comfortable, safe environment for learners to be successful. Two concepts that stress the idea of multicultural education and equity are global competence and culturally responsive teaching as defined by Gloria Ladson Billings (Sturgis & Casey 2018). In global competence, there is a stress on global issues as drivers for inquiry-based lessons at the high school level. To progress

towards not only college readiness, but also career and life, there should be a focus on global economy and issues as requirements to graduate. Within the scope of building competency-based education, there should also be a focus on culture inclusivity and responsiveness as a cornerstone of the planning and development process of the curriculum (Sturgis & Casey, 2018).

The synthesis of all the research in technology in multicultural education has three major concepts that resonate throughout. Damarin (1998) first captured the idea that big corporations push technology use and enhancement in schools. Their money drives and allows many schools access to technology. Ferdig (2007) noted the very same concept regarding companies focused on globalization pushed through technology-based solutions. In their push, they also forwarded multicultural education. Çiftçi found that students could work towards common goals and increase intercultural awareness, which is a form of globalization. All the research also showed an overall lack of multicultural and technical education. Each study cited areas for growth in the use of technology and understanding of multiculturalism. The third and final parallel is in identifying and suggesting that growth is necessary for the development and enhancement of technology and multicultural education in education; not just for the student but for educators as well. Ferdig (2007) referred to the idea as "multicultural competence to build multicultural learners. In the end, social justice might not be the driver of both technology and multicultural education, as per Damarin. While not clearly defined in any study, globalization and large corporations might bring about the change in education where multicultural education is at the forefront. As businesses currently spend money on education to enhance technology, the move towards globalization may encourage

businesses to spend money on multicultural education as an investment in future human capital. The global competence presented by Sturgis and Casey (2018) perfectly reflects how to use technology and instruction, to grow global learners.

Technology Standards

Establishing the criteria to compare research data, I reviewed the NCES Technology in Schools (2009), Every Student Succeeds Act (ESSA), Texas Education Agency (TEA), and International Society for Technology in Education (ISTE) for guidelines and standards for technology integration in the instructional setting. The NCES Technology in Schools, and ESSA only provide guidance for the implementation of technology. The TEA has both guidance and standards for technology implementation. The ISTE provides a clear set of standards for the various stakeholders on campus.

The ESSA had specific standards for technology integration in the education setting; there is a specific section on educational funding Title IV, Part A (ESSA, 2016). While there are no specific programs or software that must be implemented, it does direct local agencies to spend a portion (up to 15%) of Title IV Funds on educational technology. ESSA also provides guidelines to what is considered appropriate educational technology for Title IV funds. This includes digital learning, blended learning, and educational technology professional development.

The TEA has continued to develop plans for technology integration across the state, creating guidance for students, educators, administrators, and districts for what

technology should look like through three major documents. The Long-Range Plan for Technology 2006-2020, Technology Application Standards, and the Master Technology Teacher Standards comprise the standards for technology integration across the state of Texas. The Technology Applications Standards are comprised of 11 standards, but only five apply to all teachers; the other six refer specifically to standards for Computer Science, Web Design, Publishing, Desktop, Digital Graphics, and Multimedia Teacher (Technology Application Standards). The Master Technology Teacher standards are five areas that are broken down into multiple requirements for Master Technology Teachers. Under standard five for the Master Technology Standard it states, "the Master Technology Teacher effectively models and applies classroom teaching methodology and curriculum models that promote active student learning through the integration of technology and addresses the varied learning needs of all students" (TEA). Within the standard, the Master Technology Teacher is expected to "facilitate classroom teachers' acquisition and implementation of the knowledge and skills in the Technology Applications Standards I–V for all beginning teachers;" the standards establish a baseline for assisting other teachers with technology in the classroom.

The International Society for Technology in Education (ISTE, 2017) has been a leader in promoting the use of technology. As a nonprofit organization dedicated to improving technology use in the classroom, the ISTE is connected to over 100,000 stakeholders internationally (ISTE 2017). Along with offering resources, the ISTE has created a set of standards for students, educators, coaches, and administrators.

The ISTE standards outline key principals for each shareholder in technology integration. The guide for students helps define their roles as digital citizens and active participants in the learning process. There are seven specific criteria for students: Empowered Learner, Digital Citizen, Knowledge Constructor, Innovative Designer, Computational Thinker, Creative Communicator, Global Collaborator, and Empowered Learner (ISTE, 2017). The student along with the coach, educator, and administrator also put specific importance on being not only a good digital citizen, but also global citizen. In the role of a digital citizen, the ISTE standards specifically speak to using "collaborative technologies to work with others" (ISTE, 2017).

The criteria established by the ISTE for administrators coincide with the standards for students and expand upon their expected outcomes. The standards are comprised of seven major categories: Visionary Leadership, Digital Citizenship, Systemic Improvement, Professional Practice, and Digital Age Learning. Each category is further broken down into specific guidelines to meet the overall criteria. Visionary Leadership involves three major areas to inspire and facilitate among stakeholders, engage in the ongoing process development, and advocate for technology on all levels (ISTE, 2017).

Chapter III

Research Design

Introduction to Research Design

The purpose of this research study is to determine principals' perceptions of technology integration in an instructional setting of an urban middle school campus. Moving into an educational leadership role has widened my vision to the integration and application of technology in instruction. The study evaluates how administrators perceive technology is integrated into an instructional setting. The qualitative design of the research is intended to identify different applications for technology in the classroom as understood by administrators. The first step in technology integration should be a needs assessment for both students and staff, to understand their capabilities. By understanding the campus needs, leadership can move forward in developing a plan for technology training and integration. This study focuses on the perceptions of the administrators based on their professional experiences utilizing and integrating technology on their campuses. The study outcome may result in the development of a process to improve technology integration in the classroom.

In this section, the details of the research design process utilized in the study are provided, including the rationale for the research design, research question, conceptual framework, ethical protection measures for the participants, procedures, role of the researcher, participant selection measures, data collection process, data analysis methods, and the validation methods for the data.

To understand the perception of principals, a qualitative research method is utilized. The intent is to recognize themes and patterns in their answers, and further analyze the purpose behind them. The data was collected from four participants, originating from four different campuses, across three school districts in the Houston area. A collective case study method was utilized for data collection, as it was the best method to collect initial qualitative data on their experiences, and then refine the information to further understand the technology integration process in urban middle school campuses in the greater Houston area. The study included principals to prevent conflicts of interests with the data collection during one-on-one interviews and the follow up focus group interviews. The use of principals was to prevent any power imbalances during data collection. The participants were in equal positional power to the researcher involved in data collection.

Methodology

The best data collection approach is a collective case study, which as described by Cresswell (2014) provides the most accurate and efficient qualitative method for data collection from the participants. Cresswell frames the phenomenological case study as an "in-depth analysis of an event and can have one or more members bound by the activity" (Cresswell, 2014, p. 14). The activity or event that binds the participants is the use of technology in their middle school campuses. The case study design allows for data collection for in-depth analysis of their perceptions of technology integration on their respective campuses. The data was coded and analyzed for themes, and comparisons were made.

Rationale for Research Design

The research design is a qualitative collective case study. This method is used when a researcher is attempting to understand a problem and needs to analyze patterns and themes in the participants' experiences. The specific use of case studies allows for the collecting of in-depth data on the participants' perceptions of technology integration. The collection method involved a series of one-on-one semi structured interviews followed by two mini-focus group interviews. The selection of semi-structured interviews allows the flexibility to adjust as the participants answer the questions, to clarify refine and expand on their answers. Jamshed (2014) described the technique as "the questions in the interview guide comprise of the core question and many associated questions related to the central question, which in turn, improve further through pilot testing of the interview guide" (Jamshed, 2014 p. 87). Nine questions comprised the initial one-on-one interviews with the participants. This data was then used to design five follow up questions for the focus group interviews and to derive the predominant themes from the initial one-on-one interviews. The focus group phase included two separate mini-focus group interviews based on participants' availability. Another semi-structured interview process was utilized to collect data in the mini-focus group interview sessions.

The questions were designed to collect data based on the principals' prior experiences, training, and perception of technology integration on their campuses. This specific group of participants has multiple inputs for technology integration, covering three districts, and almost 4000 students. The qualitative data allows for an understanding of their perceptions, whether positive or negative, about the integration of technology on their campuses.

The specific use of collective case study is driven by the need to collect data on phenomenon or experience (Cresswell, 2014). The two separate collections of data inform the creation of themes that are further explored with study participants. The multiple iterations allow for additional data collection from the participants, and more focused questions to obtain extensive information regarding the principals' perceptions. The multiple iterations and member checks (Cresswell, 2014) are a necessity for triangulation to ensure validity in the data analysis. As a case study, the multiple iterations assisted in validation check. The participants were able to review the data and as the researcher, I clarified the information with the participants through member checks. The second iteration, involving semi structured mini-focus group interviews, allowed for refining, clarifying, and expanding upon themes from the initial data collection. As the present study's researcher, I was the primary collector of information, and conducted the interviews, analyzed the data, led the mini-focus groups, and conducted the final data analysis.

For data collection, the one-on-one semi-structured interview was used to gather information independently, for each participant. This allows the researcher to build on responses and clarify information. The one-on-one interviews were conducted to obtain different assistant principals' perceptions of technology integration, to triangulate data, and assure validity and reliability. The mini-focus group interviews were used to compare concepts between the principals and to further develop their perceptions with their peers. The mini-focus groups created a platform for in depth conversations on the initial data and follow up for enhanced analysis.

The research question the study is based on addresses the perception of assistant principals on technology integration in their campuses. In the study, the participants' beliefs and the factors that build and shape them, from mentorship to professional development are analyzed. The one-on-one interviews focus on identifying perceptions of technology integration that the principals have. The focus group will assist in further gathering information in a collaborative setting, to collectively explore their perceptions and how they were established.

The purpose of the research will be to answer the following question(s):

1) What are principals' perceptions of technology integration in an instructional setting of an urban middle school?

Setting and Participants

The study was conducted in urban middle schools in the Greater Houston Area. Specifically, the participants came from three different school districts, with over 100,000 students across 40 middle school campuses. Using multiple administrators from different districts allowed for data analysis that was based on different district strategies. Each assistant principal evaluates 10-15 teachers, giving the study a range of 60-90 classrooms to develop perceptions. Each district school is responsible for their own technology integration plan, from hardware to software choices.

The participants for the study are four assistant principals from three school districts in the greater Houston area, all certified and in assistant principal positions at urban middle schools. The participant selection process was non-random sampling, specifically purposive sampling. To effectively recruit participants that met the specific

credential and professional requirements for this study, purposive sampling was the most effective method for recruitment. Additionally, using purposive sampling, I was not tied to one district pool of applicants, and it expanded the range of information to the greater Houston area. This technique aligns with research provided by Saunders, Lewis, and Thornhill (2012). Two of the four criteria outlined (Saunders et al. 2012) short data collection time (6 Weeks), and simplicity in sampling as necessary within the study. In using principals, participants that held a Texas Principal K-12 Certification and currently work in principal positions on a 6^{th} - 8^{th} grade campus were needed. The participants selected were chosen based on qualifications, and as professionals I have worked with in various capacities in education. Since the use of certification and position defined the sample selection, the technique for selection was convenience sampling, specifically, purposive sampling as defined by Ilker et al. (2016). They define purposeful sampling as "the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience" (Ilker et al., 2016, p. 1). Professionally, the group is homogenous, while culturally, the group is heterogenous. The initial pool was larger, but time and availability reduced the pool of 10 to four. There were three male participants and one female participant. Their ethnicities were as follows, one Hispanic, two African American, and one Caucasian participant. They have an age range of 31-55, and an experience range of 9-30 years in education. The participants are referred to by pseudonyms in the study.

Ethics and Protection

The study used multiple levels for participants' ethical protection. The first was approval from the Institutional Review Board (IRB) at the University of Houston.

Requests for participation and the consent forms following the strict guidelines within the University of Houston IRB process were created. Along with obtaining approval from the IRB, a conflict of interest training and subsequent certification was attended by the researcher prior to conducting any research. The participants were then contacted, and they signed a consent form notifying them of their rights to not participate in the study, or to discontinue their participation at any time. Participants signed consent forms for both the one-on-one interviews and the focus group interviews.

The participants' names were not used in relation to the collected data. Participants were assigned pseudonyms for research purposes. All participant notes, recordings, and data are stored securely on an external hard drive. Only the researcher and the supervising professor have access to the study data.

As the present study's researcher, I was the primary data collector for the entire study. As an assistant principal, I do not hold a higher position and have no supervisory influence over the other participants. I have worked with the participants in different capacities. In developing the questions, I kept a neutral tone and have no prior knowledge or understanding of the participants' views, beliefs, and abilities regarding technology. I explained the purpose of the study to each participant prior to them reading and signing the consent forms.

The researcher will secure the data using password protection, with no one else having access to it. The code and audio recordings will be maintained for three years after the study is finalized and submitted as a final dissertation, which will be maintained and locked in a secure file that only the researcher has access to.

Research data supplied to the University of Houston will be kept secure and the advisor, Dr. Cameron White will maintain the data. The digital information will be password protected and secured. No hard copy of the data will be provided to the advisor unless specifically requested. If necessary, the data will be maintained by the advisor Dr. White in a secure file and kept for three years.

Procedure

The data collection was conducted in two iterations during the collective case study. The first iteration was one-to-one semi-structured interviews, consisting of nine open-ended questions. The one-on-one interviews were semi-structured to allow the freedom to clarify ideas and expand on concepts presented by the participants. The questions focused on qualitative data about the participants' perception of technology integration in the instructional setting. The questions are designed to gather information on the assistant principal's professional development, educational background, and examples of effective and ineffective implementation of technology integration. Three of the one-on-one interviews were conducted face-to-face in a natural setting for the participants (Cresswell, 2003). One of the one-on-one interviews was conducted over the phone for the convenience of the participant. The first iteration of one-on-one interviews was conducted over two weeks. The participants were given pseudonyms, and their answers to the initial nine survey questions were recorded by hand and through audio recording. The participants were notified that they were being recorded prior to questioning. The data from the one-on-one interviews was analyzed and used to create focus group questions for the second iteration of data collection.

The second iteration was broken into mini-focus group interview sessions. This was done to accommodate the availability of the participants. The mini-focus groups were conducted online so the participants remained in natural comfortable settings for them. All participants had signed consent forms prior to conducting the mini-focus group interviews. The mini-focus groups interview sections were conducted over three weeks. The purpose of the mini-focus group interviews was to collectively analyze themes and trends from the one-on-one questions about effective and ineffective practices, professional development, and technology integration strategies at their campuses. The participants retained the same pseudonyms from the one-on-one interviews. The researcher read the questions in the mini-focus groups to the entire group. The participants had the opportunity to respond to the questions, build on each other's responses and ask clarifying questions. The data was recorded in writing and through audio recording during the mini-focus group questions. The participants were notified that they were being recorded prior to the focus group questioning. The mini-focus groups replaced a single larger focus group as a method to help triangulate data and collect more data in a shorter period (Hatch, 2002).

Instruments and Data Collected

There were two instruments used for data collection. The first iteration of data collection was conducted through a one-on-one interview. The second iteration for data collection was through a focus group with the initial interview participants online. The iterative process as described by Cresswell (2015) allows the researcher to analyze the initial data from the one-on-one interviews and utilize the data to develop questions to

guide the mini-focus groups. The lead researcher conducted all the interviews, led the focus group, collected, and analyzed all the data.

The design of the initial interview was nine open-ended questions to allow the participants to expand on their background and experiences in technology integration in their careers and on their campuses. These nine questions were designed to guide the conversation and created follow up and clarifying questions, as intended by the semi-structured interview process. The design was intended to be open-ended to allow for additional questions and gather as much detailed information as possible from the participants. The first iteration of interviews was transcribed, and audio recorded. The data was used to create the questions for the follow up focus group with all the one-on-one interview participants. The questions used in the one-on-one interviews are listed below:

1. What is effective technology integration in the classroom for both students and teachers?
2. What methods, approaches, and designs do you believe allow teachers to best integrate technology into the classroom?
3. What are limiting factors in effective technology integration in the classroom?
4. How does a teacher's experience/history shape their perceptions of technology use in the classroom? Can you provide examples?
5. Do years of experience influence a teacher's perception on what is effective or ineffective?
6. Do you feel technology integration provides a benefit or a challenge in the instructional setting?

7. What are the perceptions about professional development and its effect on technology integration?
8. Have you noticed differences in integration of technology across content areas?
9. What do you use as a guide for technology integration on your campus (ISTE, TEA, other)?

From the first set of interviews, the transcripts and the audio data were reviewed to create themes and verified with member checks. Edited notes were compiled and emailed to each participant to follow up and ensure accuracy in capturing their responses for data analysis. The first iteration of data analysis was completed after the member check.

The questions for the mini-focus groups were designed from data analysis of the first interviews. They were designed to clarify the initial perceptions but also to compare, contrast, and even synthesize ideas that the participants shared. The mini-focus groups gave the participants time to reflect on their initial questions and discuss ideas with other participants. The mini-focus groups were facilitated online. The mini-focus group questions were as follows:

1. On a scale from 1 to 5, with 5 being "best" please rate the students' use of technology as a tool for learning in the classroom and be prepared to share why (Research, Assessment, Collaboration, Intervention).
2. Please describe how teachers in your schools most frequently use technology to enhance their teaching (What do you see them doing the most often for/with their students?).

3. What, if any, incentives exist for motivating teachers to integrate technology into their curriculum and other classroom learning activities? Do you think this would help balance content areas?
4. How would you design Technology Professional Development for the upcoming year? What additional resources would enhance teacher learning?
5. Do you feel you are aligned to, or incorporate ISTE standards (attached) or meet TEA recommendations?
6. Is there anything else you would like to share?

Data Analysis

The initial data analysis from the semi-structured interviews was used to develop themes and create questions for the mini-focus group interviews. Constant comparative analysis combined with inductive coding was used to organize and analyze the data to create themes for further analysis. The first two steps of constant comparative analysis based on the Lincoln and Guba model (1985) involved unitizing and categorizing. Along with using inductive coding analysis, the data was reviewed line by line and by questions to identify concepts and trends for further examination that related to the phenomena of technology integration. The semi-structured interview questions focused on effective and ineffective practices in technology integration, barriers, benefits, and professional developments that shaped their perception of technology integration.

During coding, color-coded tables were created for graphical representations and to assist in comparing larger concepts and the themes that are represented in the data results. The initial themes developed from inductive coding and the first two steps in the constant comparative analysis were used to develop initial themes and create questions

utilized mini-focus group interview sessions. The categories are the initial themes and the mini-focus group questions were derived to continue to collect on the emerging themes to bridge to step three in the constant comparative analysis filling in patterns. The mini-focus group interview sessions were recorded and transcribed, and the data was analyzed using inductive coding while reviewing the participants responses to continue filling in patterns to the point of saturation to validate themes. Responses from both the initial semi-structured interviews and the mini-focus group interviews were compared in analyzing data for the results of the research.

Validation for the research was conducted thought multiple methods. Triangulation was used as data was collected through different methods. The first iteration of data collection was one-on-one interviews followed by mini-focus group interviews after data analysis. After the initial interview, member checks were conducted through participant review of responses to the interview questions. The combination of multiple sources of data for triangulation and member checks were used to validate the data in this study.

The theoretical framework applied to the data collection and analysis was a combination of different qualitative methods. The data collection was based on the case study model for use in phenomenological studies presented by Cresswell (2014). The interview protocol for the semi-structured and mini-focus group interviews is based on techniques developed by Seidman (1998) and Jamshad (2014). The data analysis was a combination of inductive coding and constant comparative analysis along with structure based on the framework presented by Deikelmann, Allen, and Tanner's seven-stages of Heideggerian hermeneutical analysis. The stages are listed as follows:

1. Reading the interviews as a whole, to gain an overall understanding of the texts.
2. Identifying the meanings evoked by the interviews, and possible themes in the data.
3. Analysis of each document by the principal investigator. An in-depth interpretation of each text was written and given to participants.
4. Determining the credibility of each finding by returning to participants for their evaluation of how well it represented their experiences.
5. Continuing interpretation with material arising from further discussions with participants being treated as new data.
6. Identifying the themes as the researcher reviewed and re-examined the data, interpretations, and discussions with participants.
7. Preparing the final report using sufficient excerpts from the interviews to allow readers to participate in validation of the findings.

Summary

The study is designed to understand how principals perceive technology integration in middle schools in the greater Houston area, and how teachers can be supported in the future with professional development. A qualitative research design was chosen for data collection to understand the benefits and barriers related to technology integration as it allows for a deeper understanding of the perceived benefits of technology, and how it adds to classrooms across the district. The follow-up mini-focus group interviews with the administrators will help identify root causes for barriers and foundations for effective technology moving forward.

The current research provides some insight into the varying degrees of effectiveness of technology integration. Clark and Zagarell (2012) outline a divide between teachers and technology, identifying teachers as the primary entity responsible for the implementation of technology. In their research, Clark and Zagarell (2012 p. 137) further state, "many feel they are technologically savvy" although the researchers found that many teachers were not tech-savvy and have only a general knowledge of technology and only use basic applications.

The National Center for Educational Statistics (NCES, 2009 p. 69) created a full framework for technology implementation in the classroom with the final report outlining key questions for the staff; the third question was "How are training and/or professional development for staff evaluated?" This also shows that there is a gap in understanding what teachers know about implementing technology and how to address it. Voogt, Almekinders, Akkern, and Moonen's (2004) research utilized a blended approach to creating communities of learning. While they find some success, they also find that without technology use being part of the teachers' routine, it is not as effective. They identify technology as a complex practice. Even with technology training, teachers don't always make optimal use of technology integration (Vogt et al., 2004). The research shows that there is disconnect in teachers' perception of technology use and their ability to effectively integrate it into their classrooms. The present research is designed to identify what principals perceive as effective technology use and what principals perceive as the barriers to effective technology integration. In being able to identify these variables, it could allow schools and districts to address these areas through professional development and targeted instructional strategies.

Chapter IV

Results

Purpose

The purpose of the study was to analyze the perceptions of principals regarding technology integration on their campuses. This case study was designed to better understand the common phenomena of technology integration and the principal's perspective of it on their campus. Technology integration is rapidly expanding rapidly, with Forbes reporting that "$14 Billion was spent in EdTech U.S. for 2017" and it is estimated that districts spend "$75-$250 per student for technology" (Berger, 2017). With so much funding at stake, it's imperative that school districts maximize the student return on their financial investments. Effectively implementing technology is becoming a primary function of school leaders. This research study was designed to understand current perceptions and build a foundation to provide needs assessments to improve technology integration on any campus. The results in this chapter are based on the research question:

1) What are principals' perceptions of technology integration in an instructional setting of an urban middle school?

Results

The research design utilized one-on-one interviews and mini-focus group interviews to gather data. The interviews and mini-focus group questions were designed to generate themes for in-depth analysis of the principals' perceptions based on their

experience integrating technology on their campuses. Four major themes developed from the data analysis of the principals' perception of technology integration. The themes are as follows: 1) The participants perceive that there are benefits to integrating technology in the classroom, 2) There was no consensus on effective or ineffective technology integration strategies. 3)There is no perceived structure in technology integration for each campus, and 4) The participants perceptions indicated that there needs to be an improvement in professional development for technology integration.

The first theme that emerged was the participants' perception of technology integration having benefits in the classrooms. In the one-on-one interviews, all the participants stated that technology integration in the classroom was a benefit to the students. When presented the question:

> Do you feel technology integration provides a benefit or a challenge in the instructional setting?

The participants discussed the benefits they experienced in integrating technology on their campuses although for different reasons. Xavier Thomas stated, "All the kids have tablets and they are probably used at some point in time during the day, but I'm not sure if being used as a learning tool as much as it is more of a research, look up and find something sort of way." Angel Reyes stated, "In some classes, students are using technology to access materials and do self-guided learning, write papers, and conduct research." All participants indicated that students and staff use technology in the classroom, however their responses indicate that they have different levels of effectiveness and usage. Participant Angel Reyes felt that it was a long-term benefit

although teachers are initially not as comfortable, and the teaching might not be as tight, stating, “I can see scores dipping but long-term impact on student achievement is incredible.” Elan James stated, “Technology is a benefit not only in the instructional setting but beyond that… it is used everywhere and is very effective. I can’t imagine not using technology.” Quin Jones stated, “The benefit is stimulation on the kids and actually engaging them in instruction. Knowing that the kids do spend a lot of time on technology these days, and if they have someone just talking to them that’s definitely not going to get them to the point where they are learning.” The participants also stated in their experiences that there are challenges associated with technology integration in the classroom.

The participants are aligned in the belief that technology integration in the instructional setting provides benefits; however, the participants also felt that there were challenges. The challenges they discussed ranged from hardware issues such as connectivity and availability to training for students and staff. Participant Xavier Thomas stated, “The reason I see it as more of a challenge is because of the reluctance of the teachers… there are too many unanswered questions because there are so many unanswered questions, they fall back into doing what they have always done…” The concern stated by Elan James was based on the limits of hardware: “System overload, internet overload, internet dead zones, old structure building that doesn’t allow internet or Wi-Fi to go through walls and portable building not being wired properly…” The difficulties the participants experience reinforce the overall rating of three when posed the question:

On a scale from 1 to 5, with 5 being "best," please rate the students' use of technology as a tool for learning in the classroom and be prepared to share why (Research, Assessment, Collaboration, Intervention).

All participants perceive a benefit, but acknowledge the challenges associated with technology integration. The participants ranked their student use of technology as a three on a scale of 1-5. According to Xavier Thomas, even campuses with an established 1:1 program experienced challenges in effectively implementing technology in the instructional setting.

The second theme discovered through data analysis was the principals all perceived different effective and ineffective strategies utilization for technology integration. The previous theme clearly identifies a perceived benefit to technology integration. After both iterations of data collection and analysis, the methods identified as effective or ineffective for technology integration were different for every participant. In the one-on-one and mini-focus group interviews the participants were asked about effective and ineffective methods for technology integration. In analyzing at the responses during both interview sessions there is no consistent effective or ineffective method to implement or utilize technology integration.

Xavier Thomas stated, “I believe effective integration really is use the technology to enhance the learning.” Xavier also stated “The best approach is to sit down and talk with groups of teachers, to find out where they are with it and what their comfort level is with it, what ideas they have to use it and how it would be best used in there subject.”

Angel Reyes identified the SWIVL camera and the Promethean Board (interactive whiteboard) as effective tools in integrating technology into the classroom. Angel respond, "Students could come up write on the Promethean board with the interactive pen pop in a video pausing a video and using it as a computer so student and teacher both integrate the board." Angel described the use of technology for improving teaching as an effective strategy. "We also have SWIVL cameras…mainly the science teachers use them to their advantage. They set them up and record themselves teaching and they use that information for themselves." Angel also related effective technology integration into data management. Using data to target instruction and identify students for intervention wand TEKs to focus on. "We get data from Eduphoria, the software we use. We take that data to get a hotlist of kids that need intervention. We design our tutorials based on that data."

Elan James focused more on the procedure and planning for the classroom as an effective technique. Elan stated, "Technology that allows students to learn more or at a higher level, for teachers to enhance their learning. For example, I went into a classroom last week and students were using iPad to research and type their papers. Using Google Docs to do peer editing. They could work faster and share ideas with their peers." Elan also commented on how to build capacity through planning and design "Rather than having a unit where we use technology once or twice a year. Instead of this one project where we use computers to do research. A better approach is every day there is a station for student to use technology."

Quin Jones found the most effective technology strategies, “Use programs that are mentally and intellectually stimulating and programs that limit the amount of time teachers spend talking to the student. Basically, giving the kids more time to be engaged.” Quin Jones felt the overall availability of technology is necessary to be effective and have suitable resources to address issues. Quin Said “Having someone or something there that can quickly get them back on track. Training in the utilization and walking them through the lesson.”

The participants each found a different technique or utilization of technology to be effective. Xavier Thomas focused on what teachers needed in training to enhance lessons. Angel Reyes identified the use of specific hardware with the SWIVL camera and Promethean board as effective methods for technology integration. Elan James saw planning for technology and repetition as key factors to effective technology integration. Quin Jones referred to effective technology integration required a good support system from training to technology specialists to help teacher stay on track and be responsive to technology breakdowns. Quin also noted being able to walk teachers through lessons and design plans made them more effective in integrating technology into the classroom.

When asked or discussing ineffective strategies and methods for technology integration in the classroom the participants answers where all different. The responses ranged from limitation in equipment to a lack of training and professional development.

In discussing ineffective techniques for technology integration Xavier Thomas referred to having the proper equipment in the classroom. Stating “Making sure you have everything the students need for technology. All the students have cell phones but there is

more to it than just that." Xavier perceived the need for more effective technology professional development, "I don't think we do effective professional development as a whole or in subject area. We do this whole big professional development, but most teachers can't relate it to their subject or their kids."

Angel Reyes had a different perspective on what was perceived as ineffective strategies for technology integration. Angel Reyes felt the ineffective strategies was based more on poor infrastructure planning and design. "The internet going down. Having 100% of students on google Chromebooks It bogged the system down and slowed the system down and stop the test and have half of or our school do the test one day and half the next." Angel also referenced the change in personnel "Not having ITechs, internal technicians, so everything is done through the help desk…now it's hard to get professional development on certain technology… one guy has four campuses." The responses by Angel show the ineffectiveness of technology integration is based more on structure and design instead of at the campus and leadership level.

Elan James had a wide range of what was ineffective technology integration. Elan noted a lack of technology availability and training cause ineffective campus technology integration. Elan also added inability of school leaders to understand what effective technology integration could and should look like. Elan stated:

> "Lack of understanding from instructional leaders about how to evaluate the teachers' use of technology. I think full technology integration means classes look different. In a flipped classroom what the teacher is doing is different from what a teacher is doing in a traditional classroom.

> Instructional leaders need to know that, so teachers are not being penalized for what they did or didn't do."

Elan perceives the inability of leadership to understand technology integration creates ineffective integration. By not properly being able to evaluate how technology is implemented they will reinforce poor practice or limit teacher's willingness to integrate technology due to evaluation criteria.

Quin Jones discussed the lack of education on new programs pushed by the district. Quin also stated the district and funding led to ineffective technology integration. "Lack of education like this year we have Nearpod and other initiatives. There is quite a few, but if teachers have not been educated or trained…" Quin Jones felt the responsibility was split with the campus and district on funding and training deficits, "The district on providing individuals able to train and it can be from a campus and district standpoint not budgeting enough to provide the technology and they are not budgeting to where they are getting the technology on campus."

The responses to both iterations of semi-structured interviews showed each participant held a different perceptions of effective and ineffective technology integration methods and strategies. With very little overlap in perception of effective or ineffective strategies the underlying theme was the lack of a consensus among the participants.

The third theme that emerged from the data analysis was, there is no distinct structure on how to integrate technology on each campus. There were programs and

training in place, the participants' responses indicated that there was not a specific process in response to the question:

Have you noticed differences in integration of technology across content areas?

All the participants reference discrepancy in usage of technology and the effectiveness on their campuses. Angel Reyes stated, "I can speak to the history department on my campus half of the department uses it all the time and half doesn't use it enough. The downside is when they use it for kids it doesn't go as well as they planned, and that can become their reason for using it again. When the solution is to power through it until it works." The response indicates that not all teachers in the same content area utilize technology in the same way. Quin Jones answered, "Each subject has teachers where you'll see a heavy push on technology. Where going in, every child is gonna have that Chromebook and researching a topic." Elan James added, "Our science department is very good at integrating in technology and uses it to the maximum extent. I wish we had more technology; I wish we had like Google glasses that would be awesome they could really interact with anatomy and physiology in 7th and 8th grade looking at cellular structure… I really wish our social studies teachers would use more technology. Social studies teachers are stuck in lecture style. I want them in more interactive groups and on Chromebooks…" Elan James sees a difference in, and wants more technology implemented by teachers on the campus. As a leader, he wants more done with the technology, and wants even more technology to be available. His observation also highlights a difference in usage between the content areas, specifically science and social studies.

When specifically asked about the structure used for technology integration, they could not specify a guide or framework used. The participants referenced structures for tracking, and ways they were expected to see technology implementation for appraisal. This theme of technology integration was highlighted by the participants' answers to the following question:

What do you use as a guide for technology integration on your campus (ISTE, TEA other)?

The responses varied, however none of the participants stated that there was a specific guide that was used for technology integration in the instructional setting. Elan James stated, "As far as standards and looking at TEA and looking at our TEKS, that's what we look at and then we base the software purchase on what our TEKS and what our standards are in the classroom." Quin Jones stated, "We generally go by what we push out from the district or what the principal has researched and brought to the campus. One thing that stands out is Level Up and everyone in the district has Level Up training even administrators." Both principals work in the same district and have different perceptions of what standards are being applied to their campuses for technology integration. Participant Angel Reyes responded, "We do look at the TEA standards a bit but for the most part people are going along blindly. I have not seen technology objectives or anything like that specifically." Xavier Thomas' response was, "I really think the guide for technology is based on the goals for the district… it's the engine driving the train. You know you get on board or you don't. I don't think it's TEA, I don't think it's anything else I think they set up standards they want, they set up SE your supposed to

cover but how you do that is dependent and upon you campus or district." When asked if there were "goals and how we are getting to them, Xavier Thomas stated, "I don't see it and if there are, I don't know what they are. You assume what the goals are by what you're seeing. I can assume and look and see where the campus I'm on right now the direction they are going." While all the participants noted that there was a plan based on the campus or district, none of the participants identified a guide or framework that was driving how technology is integrated in the campus or classroom. These responses helped lead to the question presented to the mini-focus group interviews:

Do you feel you are aligned to or incorporate ISTE standards (attached) or TEA recommendations?

The participants were presented with the full ISTE (ISTE) standards and section of the TEA recommendations (Appendix F, G) thirty minutes prior to the interview. With no references to guide or framework, I wanted to know if the participants perceived that they were within any standards presented by ISTE or TEA. The statements revealed that they were not meeting the standards; per Xavier Thomas, "Overall I don't think we are anywhere near what these ISTE standard are saying but, we do have some bits and pieces." Xavier Thomas felt that they were furthest from empowering leaders… because of when it talks about empowering educators to exercise their professional agency build their leadership skills… I don't think as educational leaders we have done this enough." Quin Jones added to the conversation, "We need to begin to collect data on actual usage, I don't think we have, or we discuss it administratively. It may be discussed during planning like, but it's not collected to say this is what everyone is doing, and this is how

it's improving instruction, and this is how much more students are engaged as a result. All the participants stated they had never seen the ISTE standards or the TEA guidelines prior to being interviewed.

The fourth and final theme that emerged from the data analysis was the perceived need for additional training for the staff. The need for additional training was verbalized in different ways. The participants directly mentioned lack of training in response to certain questions. When the participants were asked the following:

What are limiting factors in effective technology integration in the classroom?

Three of the four participants cited training as a limiting factor. Quin Jones stated, "Integration of the new programs, it would be from a district standpoint of providing individuals who are able to train." While Xavier Thomas responded, "Proper training for teachers to know and have a comfort level with how to use the technology they have. You know and show them examples of how it might be able to be used and help them develop as they go." Angel Reyes's response identified the "lack of training in how to use the technology." These responses prompted the follow up question, "When you are talking about training and support, at what levels? The fourth participant felt that infrastructure was the limiting factor. Elan James stated, "The internet going down having and old building. We have a brick walls and sometime our hubs don't go through these bricks. And we must have several hubs. When we are taking our star interim and there is 100% student on Chromebooks it bogged the system down and slowed everything down to the point where we had to stop the test and only do have half the students one day and half of our students the next." Elan James, when answering another

question stated, “It’s hard to get professional development on certain types of technology. We have one person and he has three other campuses. He has four campuses total. So, if we need a professional development, we need to schedule according to his schedule.”

All the participants referenced the need for training, directly and indirectly, when answering other questions. Elan James addressed professional development when stating: “It’s the software, that they need professional development. I feel if they want the support it’s there.” Elan James also stressed, “You have to have professional development for your teachers and answer every question that they have and then refresh your teachers. I had to refresh our memories of novice teachers for the professional growth model.”

Xavier Thomas made these statements when being interviewed one-on-one and in the mini-focus group: “It’s a slow development of it and not a jump both feet all in at one time, because what I think happens is when you do that it becomes non-effective because they are worried about it, scared about it. They pretend like they are doing something with it. They are not using the technology and learning part of it, they are using technology the old fashion way. I’m going to do my lecture with PowerPoint instead of what technology could really be used for.” Later in the interviews Xavier Thomas stated, “I just don’t think we do enough professional development in technology integration as it is. Not as a whole or in subject areas. To me, to be very effective, most educators it’s how will this benefit my kids and me. That’s what they want to know. A lot of times its whole. We do this great big professional development and it sounds great, but a lot of teachers can’t relate it to their subject and their kids.” Xavier Thomas clearly addressed

that the district could do better in supporting technology integration through professional development.

Angel Reyes referenced professional development multiple times during interviews. The following are his responses related to professional development. "Not just using technology to use it. Rather technology makes the objective that you're focusing on better. I do see the pitfall of, I'm going to use smart board or I'm going to have kids clickers, I'm going to, I'm going to have kids use Google Classroom, but it's not really linked to the curriculum itself and it wasn't actually the most effective way to teach that skill, and that is not good technology integration." Angel Reyes also provided a direct quote about how professional development is lacking in the district; "I think the perception is the majority of it has been bad (professional development). When I talk to people, they do not like our professional development department. They feel like the people training them are either bad teachers and do not use strategies appropriate for adult learners or learners at all or they have found them, or they perceive them to think they are better than them has been a gap area." Angel Reyes' responses about professional development conveyed low confidence in the effectiveness of professional development, positively impacting technology integration.

Quin Jones was more positive about professional development but still discussed limitations on the campus. Quin Jones in discussing limitations, references initiatives such as "Nearpod" but the limiting factor cited is training. It is noted that training is available, but the teacher has to request it. Quin Jones felt that the limiting factor was

from the district "having the ability to train" and could be "based on the school if they were not willing to spend their own money to train their teachers."

Discussion of findings

The research question in this study focused on the perceptions of principals and their experience with technology integration on their campuses. The responses to the one-on-one and mini-focus group interviews were coded and divided into themes. The themes are the larger concepts that were most common to all the participants' responses in the case study. The interpretation and discussion of findings correspond to the four themes.

All the participants found there is a benefit to technology integration in the instructional setting. While they were all consistent in stating that they felt there was a benefit to technology use, the participants listed different benefits when discussing them. One participant referenced the benefit of improved student engagement multiple times when responding to questions about students and technology use. Schindler (2017 p. 25) conducted a literature review of technology integration and student engagement with the findings from the research being "limited but positive." This also corresponds with Wu and Huang's (2007) study, which found that a student-centered technology classroom had higher engagement levels than a teacher led classroom. The study also found that even though there were higher levels of student engagement, student performance was the same in both classrooms. This research aligns with the participants citing technology as a benefit, but rating usage at only 3 out of 5 because they did not always see benefits in performance. Another participant referred to technology as a "tool to enhance the

classroom," and this participant felt that there was a benefit, but as a supplement to methods that the teacher was already implementing.

Elan James was more focused on the data analysis side as a major benefit and frequently referenced technology to collect and analyze student data to assist in planning and developing lessons for the students. The ability to quickly gather data and analyze trends allows administrators and teachers to adjust the lessons to meet the needs of students. Personalized learning is entirely structured around meeting the students where they are academically and allowing them to proceed at their own rate. The benefit of being able to collect and quickly analyze data is supported through research. Lodge and Corrin (2017) found that "the mass of data already being collected about student learning provides a source of greater insight into student learning that have not previously been available." Being able to effectively utilize not only academic, but behavioral and attendance data are all ways to maximize student achievement. While there are numerous potential benefits as noted in the literature review, there is inconsistent data on whether technology increases student achievement.

The third theme in the data analysis was the perception of the participants that there was not a framework or structure in place for technology integration in the instructional setting. When asked during both interview sessions, participants were not familiar with ISTE or TEA guidance for technology integration. The participants did name technology processes currently in place such as the "Level Up" program or general guidance from the district to use technology. None of the participants could speak to there being a clear guide on how much technology integration should happen in the

classroom. They all stated that there were discrepancies in use by teachers across and within content areas across their campuses. When asked if incentives could help foster more technology integration or balance the use across campus, the participants felt that the teachers' intrinsic motivation is a major driver in how much effort teachers put into technology integration, and incentive would not work. The lack of a framework or structure could also be the reason for there being inconsistent data on student achievement with technology integration. If teachers in the same department are using technology differently, their data is not necessarily comparable for results of technology integration. The Texas Immersion Pilot (Shapley, 2010) conducted by the Texas Center for Educational Research for the TEA had different levels of technology implementation for a standard technology immersion program. Without a framework or guidelines, the individual administrations were responsible for developing and implementing the immersion program. They concluded, "School administrators advanced implementation through their provision of support for teachers' technology immersion efforts, whereas teachers' greater support for immersion along with technical support elevated Student Access and Use" (Shapley, 2010, p. 96). With consistent guidelines from implementations to goals and expectations, the results across campuses could become more consistent resulting in better determination of student success and engagement.

The fourth and final theme resulting from the data analysis was the perception that professional development was inadequate for technology integration in the instructional setting. All the participants at one point in the interviews mentioned needing more and better professional development. Participant Angel Reyes even stated that the professional development was "bad" for multiple reasons. Xavier Thomas'

issues with professional development were because it was not focused or specific for content areas, so not all teachers found sessions to be useful. This lack of developed, targeted professional development is also consistent with existing research. As referenced in the literature review, Peterson (2016) found that lack of technology training was limiting the levels of technology integration. Minor, Losike-Sedimo, Raglan, and Royster (2013) found that targeted professional development for teachers using the SMART Board increased student outcomes over a three-year period. This study directly confirms statements made by Xavier Thomas that more directed professional development would benefit teachers and students more than broader professional development for technology integration.

Summary

This chapter provided a review of the data analysis results to answer the research question "What are principals' perceptions of technology integration in an instructional setting of an urban middle school?" The four major themes derived from the participants' responses were: 1) The participants perceive that there are benefits to integrating technology in the classroom, 2) There was no consensus on effective or ineffective technology integration strategies, 3) There is no perceived structure in technology integration for each campus, and 4) The participants perceptions indicated that there needs to be an improvement in professional development for technology integration. The data analysis did not identify effective or ineffective strategies for technology integration in the instructional setting. In Chapter 5, the discussion of results is presented.

Chapter V

Conclusion

Introduction

There has been massive growth of technology integration in the instructional setting. Technology is a global multi-billion-dollar industry that is still growing. Apple, Google, and Microsoft, some of the largest global technology companies have departments solely focused on putting their technology in classrooms around the world. School districts compete to fund the newest technology initiatives to improve student achievement. Technology in classrooms has evolved rapidly, having moved from computer labs to 1:1 learning. Personalized learning, blended learning, and M-Learning have all become techniques to not only engage students but assist them in learning at their individual levels. With billions of dollars, globally, dedicated to funding technology and the constant focus on student results, this study's aim was to provide insight on the implementation of technology in the instructional setting. The participants were comprised of school leaders that implement and education and technology integration strategies. This chapter will provide a summary of the research, implications for practice, limitations of the study, and suggestions for future research.

This research was a qualitative comparative case study conducted to understand principals' perceptions of technology integration on their campuses based on their individual and combined experiences. Data were collected through one-on-one, and mini-focus group interviews that were recorded through audio and video. The data was manually coded and organized into these four major themes: 1) The participants perceive

that there are benefits to integrating technology in the classroom, 2) There was no consensus on effective or ineffective technology integration strategies; 3) There is no perceived structure in technology integration for each campus, and 4) The participants' perceptions indicated that there needs to be an improvement in professional development for technology integration. The themes were developed to answer the following research question.

1) What are principals' perceptions of technology integration in an instructional setting of an urban middle school?

The perceptions from the participants are based on experiences they have as academic leaders on their individual campuses. The participants represent four schools across three districts in Houston. The data themes are consistent with current research into technology integration on urban campuses. The data analysis did not provide insight into specific strategies that are effective or ineffective in the instructional setting.

Implications for practice

The use of a comparative case study for research allowed for gathering of information on the perceptions of the principals regarding their experiences with technology integration on their campuses. While they worked in different campuses and different districts, they all voiced different variations of the same three challenges, along with different possibilities to the benefit of technology at their schools. The benefits of student engagement, collaboration, and instant feedback present significant opportunities for students and teachers to show growth. Studies referred to in the literature review also support increased student engagement, collaboration, and easy manipulation of data for

feedback as consistently positive outcome with technology use. The challenges experienced by the school leaders of professional development, and inconsistent and non-existent structure are also supported by multiple studies highlighted in the literature review. The benefits and challenges average to a 3 out of 5 rating based on the participants responses. The participants stated technology integration brought benefits and challenges to their campus and students. The study focused on the principals as school leaders and their perceptions of technology integration on their campuses.

The implication from all the participants is that as educational leaders, we need to focus our professional development to meet our teachers' and our students' needs. This professional development should be part of a larger structure in place, to not only integrate technology but, be able to track usage to identify effective software, hardware, and technology integration strategies. This structure should include performance goals in technology usage and student achievement. With the research and participant information being consistent in showing increased levels of student engagement, the framework for employment of technology integration and tracking technology integration should help identify why there is no increase in student achievement, if there is an increase in engagement.

The implication at the district level for this research is to continue research into technology integration strategies. With so much funding being spent on integrating technology in hardware, software, and training costs, it is worth asking how this spending is being evaluated. Two applicable business terms are "return on investment" and "value added." A district has certain business relationship to the students and families, to be

able to show that money spent on technology adds this benefit or value. This research study shows that educational leaders utilize technology on their campuses and see the benefits it can have. These leaders are not equipped with systems in place that measure the effectiveness and provide teachers with the specific and individualized training that they need, to maximize the impact of the technology on their campuses.

The basic structures are all in place for districts to integrate technology. In the present research, multiple sources that would provide a foundation, from software to hardware, on how to integrate technology from the campus to district level, and how to implement an effective plan have been identified. Furthermore, identified and referenced are the Maine Technology Learning Initiative (MLTI), the Texas Immersion Program (TIP), which was independently evaluated by Shapley (2007; 2010), and the program in Michigan researched by Goodley, all studies that evaluate and provide suggestions for technology integration.

The Texas Education Agency (TEA, 2006) created the "Long Range Plan for Technology 2006-2020," for the 80th Legislature, which has standards and expectations for technology integration from TEA. The research conducted by the federal government also provided structure and guidance for campus and district level technology integration. The government produced reports, used in this research study, that include the following: "National Center for Education Statistics Technology in Schools: Suggestions, Tools, and guidelines for assessing Technology in Elementary and Secondary Education (2003), National Center for Education Statistics: Teachers Use of Educational Technology in U.S. Public Schools May 2010 and the most recent (2009), National Education

Technology Plan Update (2017), and Reimagining the Role of Technology in Education (2017). Even implementing the ISTE standards utilized for this research could create a common, basic level of expectations for teachers, students, and administrators.

Suggestions for future research

This research was an entry-level study into the perceptions of principals in three districts. Future research recommendations could include expanding from the limitations found in this study, and creating a broader and more generalizable study, to develop implementation plans at the campus and district level. In identifying the limitations of this research, plans to improve future research designs can be developed. The major limiting factors found were the number of participants in the study, having participants from different districts, and not having a mixed methods research design to incorporate quantitative data to determine follow up studies or action plans and not identifying leadership responsibilities in technology integration.

The first limitation to the study was the limited number of participants. In future studies, 20-30 participants could result in a wider range of responses and develop a better mean to work from in developing solutions for technology integration structure and professional development. The limiting factor for the researcher was the limited time available to complete the research. Logistically, it was impossible as a single researcher to increase the number of participants that met the criteria in with purposive sampling in place. With a team and more time, the added number of participants would result in refined data and answers, and possibly assist identifying specific strategies and structural designs for technology integration that are more generalizable to other districts and

campuses. The recommendation to increase the number of participants and ensure the results of the study can be effectively replicated and confirmed.

The second limitation was the dispersion of the participants based on working in different districts. This created structural differences in their data. One district had a general training program in place called Level UP, while another had all their students in a 1:1 program. While the major themes coincided, their needs were different based on access to technology and what they needed for professional development. For future research, the initial study could work best if conducted in a single district. This would provide the participants with a common knowledge base when answering questions. While the 1:1 district had professional development needs, and the district with the Level Up program had professional development needs, the training they needed was significantly different. The 1:1 district needed more specific training on programs to benefit teachers and content areas, whereas the Level Up district needed training on hardware and integrating the software introduced in Level Up. Conducting the research at a district level would better identify the district needs for its educational leaders. The data could be utilized to develop plans to improve technology integration within the district by addressing their specific needs.

The third limitation is quantitative data. The study was effective in gathering principals' perception of technology integration. To effectively move the research forward, more quantitative analysis on technology integration is required: Specifically, identifying the effectiveness of students using technology in teachers' classrooms, and the numbers of hours of technology professional development effective teachers are

receiving when compared to ineffective teachers. Base level data could help in the design of a structure to include how often technology should be used in the instructional setting. Ideally, it would be a longitudinal study to also identify trends in students' achievement, to help identify effective and ineffective practices over time. The additional data could also do a comparison of technology professional development to the performance of students. Across a district this could clarify the levels of technology professional development in hours to see improvement in student achievement and technology implementation.

The final addition I would want implemented for future research would be to collect more data on the principals'' training and knowledge of technology integration. As mentioned throughout the study the principals are the primary implementers of educational policy and strategy to include technology integration. Grady (2011) identifies the principal not only as the educational leader, but also as the technology leaders on campus. While this study focused on the principals' perception of technology integration it lacked a significant focus on the principals as school leaders. Future studies should focus on what technology skills principals can bring to the campus that enhance or impede technology integration. Grady (2011) specifically states "Principals who are comfortable with technology become models of technology use in schools." This would a focal point in future studies. Understanding the principals are the driving force in implementation of all programs on campus. Knowing how they influence the benefits and challenges of technology on their campuses will clarify how to improve technology implementation on their campus.

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Appendix A

Protocol

Table 1: IRB Approval

UNIVERSITY of HOUSTON

DIVISION OF RESEARCH
Institutional Review Boards

APPROVAL OF SUBMISSION

October 22, 2018

Johnny Morse

jtmorse2@uh.edu

Dear Johnny Morse:

On October 22, 2018, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Perceptions of Technology Integration
Investigator:	Johnny Morse
IRB ID:	STUDY00001154
Funding/ Proposed Funding:	Name: Unfunded
Award ID:	
Award Title:	
IND, IDE, or HDE:	None
Documents Reviewed:	• Informed Consent Focus group.pdf, Category: Other; • AISD research approval Morse.pdf, Category: Letters of Cooperation / Permission; • Research Questions.pdf, Category: Study tools (ex: surveys, interview/focus group questions, data collection forms, etc.); • Request for Participation (Morse).pdf, Category: Recruitment Materials; • Permission to apply for research study Morse.pdf, Category: Other; • HRP 502 Informed Consent non clinical, Category: Consent Form; • HRP-503 Protocol Morse.pdf, Category: IRB Protocol; • Informed Consent Interviews.pdf, Category: Other;
Review Category:	Expedited
Committee Name:	Not Applicable
IRB Coordinator:	Danielle Griffin

The IRB approved the study from October 22, 2018 to October 21, 2019, inclusive.

UNIVERSITY of HOUSTON

DIVISION OF RESEARCH
Institutional Review Boards

To ensure continuous approval for studies with a review category of "Committee Review" in the above table, you must submit a continuing review with required explanations by the deadline for the September 2019 meeting. These deadlines may be found on the compliance website (http://www.uh.edu/research/compliance/). You can submit a continuing review by navigating to the active study and clicking "Create Modification/CR."

For expedited and exempt studies, a continuing review should be submitted no later than 30 days prior to study closure.

If continuing review approval is not granted on or before October 21, 2019, approval of this study expires and all research (including but not limited to recruitment, consent, study procedures, and analysis of identifiable data) must stop. If the study expires and you believe the welfare of the subjects to be at risk if research procedures are discontinued, please contact the IRB office immediately.

Unless a waiver has been granted by the IRB, use the stamped consent form approved by the IRB to document consent. The approved version may be downloaded from the documents tab.Attached are stamped approved consent documents. Use copies of these documents to document consent.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.

If your study meets the NIH or FDA definitions of clinical trial, or may be published in an ICMJE journal, registration at ClinicalTrials.gov is required. See the UH ClinicalTrials.gov webpage for guidance and instructions.

Sincerely,

Research Integrity and Oversight (RIO) Office
University of Houston, Division of Research
713 743 9204
cphs@central.uh.edu
http://www.uh.edu/research/compliance/irb-cphs/

Table 2: Recruitment Letter

Request for participation in a research project

"Principals' Perceptions of Technology Integration"

You are being invited to participate in a research project conducted by Johnny Morse from the Department of Education at the University of Houston. This project is part of doctoral dissertation research, and is conducted under the supervision of Dr. Cameron White

PURPOSE OF THE STUDY

The purpose of the research will be to answer the following question(s):

1. What are principals' perceptions of technology integration in an instructional setting of an urban middle school?

NON-PARTICIPATION STATEMENT

Your participation is voluntary and you may refuse to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled. You may also refuse to answer any question.

PROCEDURES

The research will be conducted in two parts. The first part is a one to one interview consisting of ten questions. The second is a focus group interview consisting of eight questions. Each sessions should take 45 minutes to complete.

You will be asked a series of questions relating to your experience with integrating technology on your middle school campus. The audio will be recorded and the responses will be recorded manually.

CONFIDENTIALITY

Your participation in this project is anonymous. Please do not write your name on any of the research materials to be returned to the principal investigator.

PUBLICATION STATEMENT

The results of this study may be published in professional and/or scientific journals. It may also be used for educational purposes or for professional presentations. However, no individual subject will be identified.

If you have any questions, you may contact Johnny Morse at jtmorse2@uh.edu.org. You may also contact Dr. Cameron White, faculty sponsor, at cswhite@central.uh.edu.

ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713-743-920)

Table 3: One-on-one Interview Consent Page

Informed Consent: One-on-one Interviews.

You are being invited to participate in a research project conducted by Johnny Morse from the Department of Education at the University of Houston. This project is part of doctoral dissertation research and is conducted under the supervision of Dr. Cameron White. The interview should take approximately 45 minutes to complete.

NON-PARTICIPATION STATEMENT
Your participation is voluntary, and you may refuse to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled. You may also refuse to answer any question.

PURPOSE OF THE STUDY
The purpose of the research will be to answer the following question(s):

1) What are principal's perception of technology integration in an instructional setting of an urban middle school?

PROCEDURES
You will be asked a series of questions relating to your experience with integrating technology on your middle school campus. The audio will be recorded, and the responses will be recorded manually. The responses will be analyzed and followed up with a focus group session on technology integration with the other participants in the study.

CONFIDENTIALITY
Your participation in this project is anonymous. Please do not write your name on any of the research materials to be returned to the principal investigator.

RISKS/DISCOMFORTS
There are no foreseeable risks involved with participation in this study.

BENEFITS
While you will not directly benefit from participation, your participation may help develop a plan for technology integration within the district.

ALTERNATIVES
Participation in this project is voluntary and the only alternative to this project is non-participation.

PUBLICATION STATEMENT
The results of this study may be published in professional and/or scientific journals. It may also be used for educational purposes or for professional presentations. However, no individual subject will be identified.

If you have any questions, you may contact Johnny Morse at jtmorse@aldineisd.org. You may also contact Dr. Cameron White, faculty sponsor, at cswhite@central.uh.edu.

ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713-743-9204).

Table 4: Mini-Focus Group Consent Page

Informed Consent: Mini-Focus Group.

You are being invited to participate in a research project conducted by Johnny Morse from the Department of Education at the University of Houston. This project is part of doctoral dissertation research and is conducted under the supervision of Dr. Cameron White. The mini-focus group should take approximately 45 minutes to complete.

NON-PARTICIPATION STATEMENT
Your participation is voluntary, and you may refuse to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled. You may also refuse to answer any question.

PURPOSE OF THE STUDY
The purpose of the research will be to answer the following question(s):

1) What are principals' perception of technology integration in an instructional setting of an urban middle school?

PROCEDURES
You will be asked a series of questions relating to your experience with integrating technology on your middle school campus. The audio will be recorded and the responses will be recorded manually.

CONFIDENTIALITY
Your participation in this project is anonymous. Please do not write your name on any of the research materials to be returned to the principal investigator.

RISKS/DISCOMFORTS
There are no foreseeable risks involved with participation in this study.

BENEFITS
While you will not directly benefit from participation, your participation may help develop a plan for technology integration within the district.

ALTERNATIVES
Participation in this project is voluntary and the only alternative to this project is non-participation.

PUBLICATION STATEMENT
The results of this study may be published in professional and/or scientific journals. It may also be used for educational purposes or for professional presentations. However, no individual subject will be identified.

If you have any questions, you may contact Johnny Morse at jtmorse@aldineisd.org.

You may also contact Dr. Cameron White, faculty sponsor, at cswhite@central.uh.edu.

ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UNIVERSITY OF HOUSTON COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (713-743-9204).

Appendix B

Questions

Table 5: One-on-one Interview Questions

Initial Survey Questions

1. What is effective technology integration in the classroom for both students and teachers?

2. What methods, approaches, and designs do you believe allows teachers to best integrate technology into the classroom?

3. What is effective technology integration in the classroom for both students and teachers?

4. What are limiting factors in effective technology integration in the classroom?

5. How does a teacher's experience/history shape their perceptions of technology use in the classroom? Can you provide examples?

6. Does years of experience influence a teacher's perception on what is effective? or ineffective?

7. Do you feel technology integration provides a benefit or a challenge in the instructional setting?

8. What are perceptions about professional development and its effect on technology integration?

9. Have you noticed differences in integration of technology across content areas?

10. What do you use a guide for technology integration on your campus ISTE, TEA other?

Table 6: Mini-focus group Questions

1. On a scale from 1 to 5, with 5 being "best", please rate the students' use of technology as a tool for learning in the classroom and be prepared to share why (Research, Assessment, Collaboration, Intervention).

-What is the best use/method?

2. Please describe how teachers in your schools most frequently use technology to enhance their teaching (What do you see them doing the most often for/with their students).

3. What if any incentives exist for motivating teachers to integrate technology into their curriculum and other classroom learning activities?

-Would incentives help balance use across content?
-Anything else that would help balance usage across content areas.

4. How would you design Technology PD for the upcoming year? What additional resources would enhance teacher learning?

-What would be the additional resources needed overall?

5. Do you feel you are aligned to or incorporate ISTE standards (attached) or TEA recommendations?

-What ISTE standard is your best and which ISTE is your campus furthest from?

6. Is there anything else you would like to share?

Appendix C

ISTE Standards

Table 7: ISTE Standards

1. Equity and Citizenship Advocate

Leaders use technology to increase equity, inclusion, and digital citizenship practices. Education leaders:

a. Ensure all students have skilled teachers who actively use technology to meet student learning needs.
b. Ensure all students have access to the technology and connectivity necessary to participate in authentic and engaging learning opportunities.
c. Model digital citizenship by critically evaluating online resources, engaging in civil discourse online and using digital tools to contribute to positive social change.
d. Cultivate responsible online behavior, including the safe, ethical and legal use of technology.

2. Visionary Planner

Leaders engage others in establishing a vision, strategic plan and ongoing evaluation cycle for transforming learning with technology. Education leaders:

a. Engage education stakeholders in developing and adopting a shared vision for using technology to improve student success, informed by the learning sciences.
b. Build on the shared vision by collaboratively creating a strategic plan that articulates how technology will be used to enhance learning.
c. Evaluate progress on the strategic plan, make course corrections, measure impact and scale effective approaches for using technology to transform learning.
d. Communicate effectively with stakeholders to gather input on the plan, celebrate successes and engage in a continuous improvement cycle.
e. Share lessons learned, best practices, challenges and the impact of learning with technology with other education leaders who want to learn from this work.

3. Empowering Leader

Leaders create a culture where teachers and learners are empowered to use technology in innovative ways to enrich teaching and learning. Education leaders:

a. Empower educators to exercise professional agency, build teacher leadership skills and pursue personalized professional learning.
b. Build the confidence and competency of educators to put the ISTE Standards for Students and Educators into practice.
c. Inspire a culture of innovation and collaboration that allows the time and space to explore and experiment with digital tools.
d. Support educators in using technology to advance learning that meets the diverse learning, cultural, and social-emotional needs of individual students.
e. Develop learning assessments that provide a personalized, actionable view of student progress in real time.

4. Systems Designer

Leaders build teams and systems to implement, sustain and continually improve the use of technology to support learning. Education leaders:

a. Lead teams to collaboratively establish robust infrastructure and systems needed to implement the strategic plan.
b. Ensure that resources for supporting the effective use of technology for learning are sufficient and scalable to meet future demand.
c. Protect privacy and security by ensuring that students and staff observe effective privacy and data management policies.
d. Establish partnerships that support the strategic vision, achieve learning priorities and improve operations.

5. Connected Learner

Leaders model and promote continuous professional learning for themselves and others. Education leaders:

a. Set goals to remain current on emerging technologies for learning, innovations in pedagogy and advancements in the learning sciences.
b. Participate regularly in online professional learning networks to collaboratively learn with and mentor other professionals.
c. Use technology to regularly engage in reflective practices that support personal and professional growth.
d. Develop the skills needed to lead and navigate change, advance systems and promote a mindset of continuous improvement for how technology can improve learning.